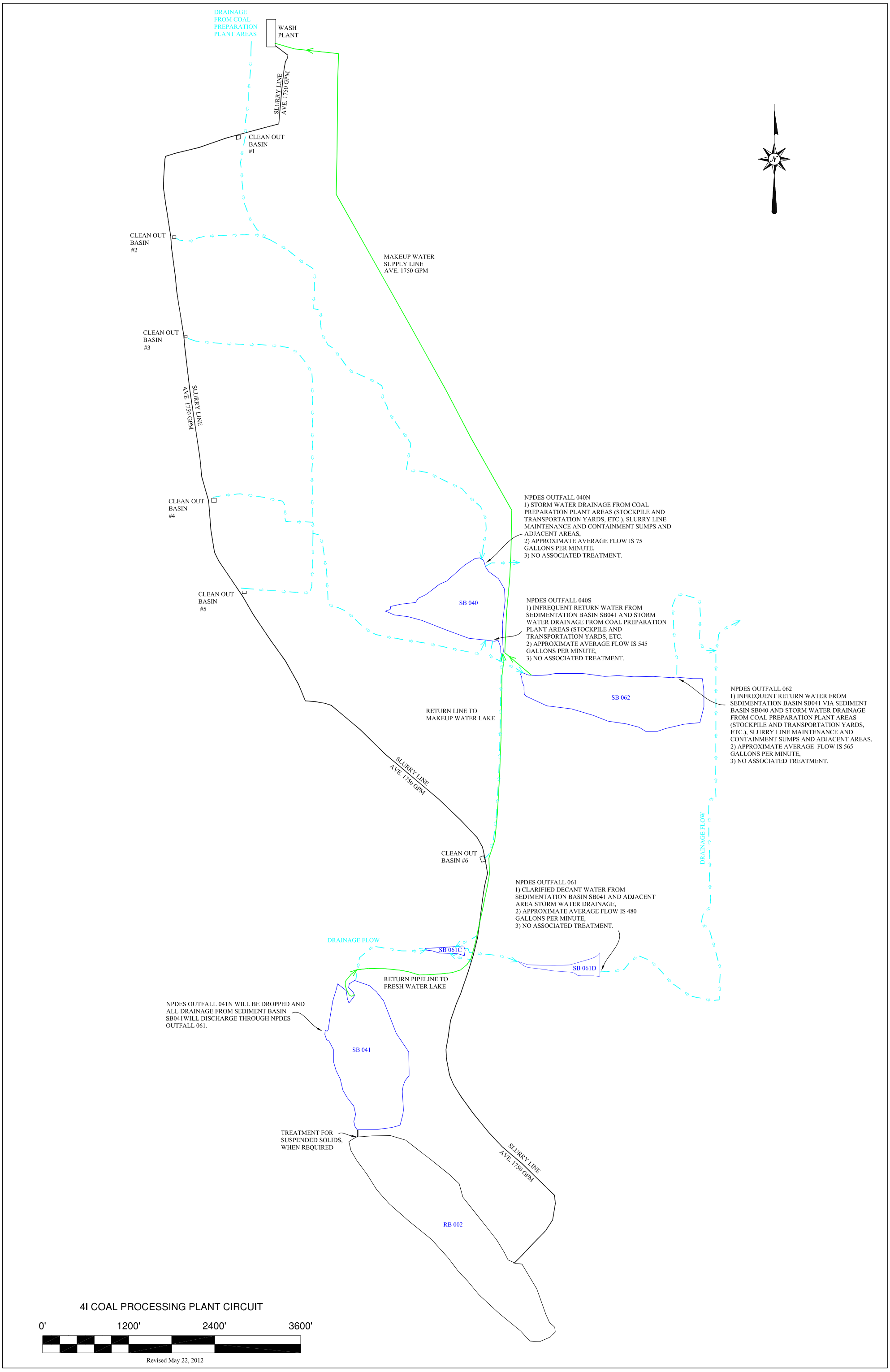
APPENDIX D


DRAINAGE FROM COAL PREPARATION PLANT AREAS
WASH PLANT
SLURRY LINE AVE. 1750 GPM
CLEAN OUT BASIN #1
CLEAN OUT BASIN #2
CLEAN OUT BASIN #3
CLEAN OUT BASIN #4
CLEAN OUT BASIN #5
CLEAN OUT BASIN #6
MAKEUP WATER SUPPLY LINE AVE. 1750 GPM
SLURRY LINE AVE. 1750 GPM
SLURRY LINE AVE. 1750 GPM
SLURRY LINE AVE. 1750 GPM
N
NPDES OUTFALL 040N
1) STORM WATER DRAINAGE FROM COAL PREPARATION PLANT AREAS (STOCKPILE AND TRANSPORTATION YARDS, ETC.), SLURRY LINE MAINTENANCE AND CONTAINMENT SUMPS AND ADJACENT AREAS,
2) APPROXIMATE AVERAGE FLOW IS 75 GALLONS PER MINUTE,
3) NO ASSOCIATED TREATMENT.
SB 040
NPDES OUTFALL 040S
1) INFREQUENT RETURN WATER FROM SEDIMENTATION BASIN SB041 AND STORM WATER DRAINAGE FROM COAL PREPARATION PLANT AREAS (STOCKPILE AND TRANSPORTATION YARDS, ETC.
2) APPROXIMATE AVERAGE FLOW IS 545 GALLONS PER MINUTE,
3) NO ASSOCIATED TREATMENT.
SB 062
NPDES OUTFALL 062
1) INFREQUENT RETURN WATER FROM SEDIMENTATION BASIN SB041 VIA SEDIMENT BASIN SB040 AND STORM WATER DRAINAGE FROM COAL PREPARATION PLANT AREAS (STOCKPILE AND TRANSPORTATION YARDS, ETC.), SLURRY LINE MAINTENANCE AND CONTAINMENT SUMPS AND ADJACENT AREAS,
2) APPROXIMATE AVERAGE FLOW IS 565 GALLONS PER MINUTE,
3) NO ASSOCIATED TREATMENT.
RETURN LINE TO MAKEUP WATER LAKE
DRAINAGE FLOW
NPDES OUTFALL 061
1) CLARIFIED DECANT WATER FROM SEDIMENTATION BASIN SB041 AND ADJACENT AREA STORM WATER DRAINAGE,
2) APPROXIMATE AVERAGE FLOW IS 480 GALLONS PER MINUTE,
3) NO ASSOCIATED TREATMENT.
DRAINAGE FLOW
SB 061C
SB 061D
RETURN PIPELINE TO FRESH WATER LAKE
NPDES OUTFALL 041N WILL BE DROPPED AND ALL DRAINAGE FROM SEDIMENT BASIN SB041WILL DISCHARGE THROUGH NPDES OUTFALL 061.
SB 041
TREATMENT FOR SUSPENDED SOLIDS, WHEN REQUIRED
SLURRY LINE AVE. 1750 GPM
RB 002
4I COAL PROCESSING PLANT CIRCUIT
0'
1200'
2400'
3600'
Revised May 22, 2012

APPENDIX D – EXHIBIT 1

```
**************************************
*          AMAX DATA SYSTEMS         *
*  ENGINEERING SYSTEMS DEVELOPMENT   *
*      ENVIRONMENTAL ENGINEERING     *
*        HYDROGRAPH GENERATION       *
**************************************
```

HYGEN - Version 3.2I
FILE: BASINSP3 PRREPORT A

JANUARY 26, 1990

PROJ TITLE: PROPOSED SEDIMENT BASIN SP-3
SILTATIOPN CONTROL FOR PLANT AREA

LOCATION: AMAX COAL INDUSTRIES INC - PENNDIANA FLD
SULLIVAN COUNTY, INDIANA

WATERSHED: DISTURBED AREA AROUND PREP PLANT

WATERSHED ANALYSIS TABLE

METHOD OF COMPUTATION

RUNOFF VOLUME	= Bureau of Reclamation
PEAK DISCHARGE	= SCS Unit Hydrograph

RAINFALL PARAMETERS

RAINFALL RETURN PERIOD	= 10.0 YEARS
RAINFALL DURATION	= 24.00 HOURS
RAINFALL AMOUNT	= 4.51 INCHES
TIME INTERVAL	= 0.10 HOURS
RAINFALL DISTRIBUTION	= SCS Type II

WATERSHED PARAMETERS

TOTAL WATERSHED AREA	= 32.3 ACRES (0.050 SQ MI)
SCS RUNOFF CURVE NUMBER	= 87.0
MINIMUM RETENTION RATE	= 0.065 INCHES/HOUR
TIME OF CONCENTRATION	= 0.56 HOURS

RAINFALL - RUNOFF SUMMARY

PEAK DISCHARGE	= 74.2 CFS
TIME TO PEAK (FROM START OF RAIN)	= 12.3 HOURS
RUNOFF VOLUME	= 6.8 ACRE-FEET

```
************************************
*         AMAX DATA SYSTEMS        *
*  ENGINEERING SYSTEMS DEVELOPMENT *
*     ENVIRONMENTAL ENGINEERING    *
*         RESERVOIR ROUTING        *
************************************
```

RSROUT - Version 2.0I
FILE: BASINSP3 PRREPORT A

JANUARY 26, 1990

PROJ TITLE: PROPOSED SEDIMENT BASIN SP-3
SILTATIOPN CONTROL FOR PLANT AREA
LOCATION: AMAX COAL INDUSTRIES INC - PENNDIANA FLD
SULLIVAN COUNTY, INDIANA
RESERVOIR: SEDIMENT BASIN SP-3
PLANT AREA SEDIMENT CONTROL

RESERVOIR ROUTING - SUMMARY TABLE

(ALL TIMES ARE FROM START OF RAINFALL)

INFLOW PARAMETERS	
WATERSHED AREA	32.30 ACRES
RAINFALL RETURN PERIOD	10.00 YEARS
RAINFALL DURATION	24.00 HOURS
RAINFALL AMOUNT	4.51 INCHES
TIME AT START OF INFLOW	6.20 HOURS
PEAK INFLOW	74.19 CFS
TIME TO PEAK INFLOW	12.30 HOURS
INFLOW RUNOFF VOLUME	6.76 ACRE-FEET
TIME TO END OF INFLOW	20.30 HOURS
RESERVOIR PARAMETERS	
RESERVOIR ELEV. AT START OF STORM	550.00 FEET
NORMAL POOL ELEVATION	550.00 FEET
EMBANKMENT CREST ELEVATION	555.00 FEET
STORAGE VOLUME & DISCHARGE RATE AT:	
POOL ELEVATION AT STORM START:	10.49 AC-FT, 0.0 CFS
NORMAL POOL ELEVATION	10.49 AC-FT, 0.0 CFS
EMBANKMENT CREST ELEVATION	19.89 AC-FT, 1747.3 CFS
ROUTING SUMMARY	
PEAK RESERVOIR ELEVATION	550.90 FEET
TIME TO PEAK RESERVOIR ELEVATION	12.50 HOURS
OUTFLOW RATE AT PEAK ELEVATION	62.10 CFS
FREEBOARD AT PEAK ELEVATION	4.10 FEET
* TIME TO DRAWDOWN TO NORMAL POOL	7.90 HOURS
OUTFLOW RUNOFF VOLUME	6.79 ACRE-FEET
ROUTING TIME INCREMENT	0.10 HOURS

* NOTE: FROM TIME OF PEAK RESERVOIR ELEVATION

RSROUT - Version 2.01
FILE: BASINSP3 STORAGE

JANUARY 26, 1990

PROJ TITLE: PROPOSED SEDIMENT BASIN SP-3
SILTATIOPN CONTROL FOR PLANT AREA
LOCATION: AMAX COAL INDUSTRIES INC - PENNDIANA FLD
SULLIVAN COUNTY, INDIANA
RESERVOIR: SEDIMENT BASIN SP-3
PLANT AREA SEDIMENT CONTROL

RESERVOIR ELEVATION VS SURFACE AREA AND STORAGE

RESERVOIR ELEVATION	SURFACE AREA	STORAGE CAPACITY
(FEET)	(ACRES)	(AC-FT)
540.00	0.00	0.00
542.00	0.73	0.73
545.00	1.16	3.57
550.00	1.61	10.49
555.00	2.15	19.89

RSROUT - Version 2.0I
FILE: BASINSP3 DISCHRGE A4

JANUARY 26, 1990

PROJ TITLE: PROPOSED SEDIMENT BASIN SP-3
SILTATIOPN CONTROL FOR PLANT AREA
LOCATION: AMAX COAL INDUSTRIES INC - PENNDIANA FLD
SULLIVAN COUNTY, INDIANA
RESERVOIR: SEDIMENT BASIN SP-3
PLANT AREA SEDIMENT CONTROL

OUTLET DEVICE: OPEN CHANNEL SPILLWAY - 10 FT BOTTOM

RESERVOIR ELEVATION VS. DISCHARGE

FIRST OUTLET DEVICE

RESERVOIR ELEVATION (FT)	DISCHARGE (CFS)
550.00	0.00
550.10	1.50
550.20	4.70
550.30	9.30
550.40	15.20
550.50	22.20
550.60	30.50
550.70	39.90
550.80	50.40
550.90	62.10
551.00	62.10
551.20	104.20
551.40	138.30
551.60	177.20
551.80	221.30
552.00	270.50
553.00	600.90
554.00	1086.50
555.00	1747.30

```
**********************************
*         AMAX DATA SYSTEMS      *
*  ENGINEERING SYSTEMS DEVELOPMENT *
*     ENVIRONMENTAL ENGINEERING   *
*       HYDROGRAPH GENERATION     *
**********************************
```

HYGEN - Version 3.2I
FILE: BASINSP3 PRREPORT A

JANUARY 26, 1990

PROJ TITLE: PROPOSED SEDIMENT BASIN SP-3
SILTATIOPN CONTROL FOR PLANT AREA

LOCATION: AMAX COAL INDUSTRIES INC - PENNDIANA FLD
SULLIVAN COUNTY, INDIANA

WATERSHED: DISTURBED AREA AROUND PREP PLANT

WATERSHED ANALYSIS TABLE

METHOD OF COMPUTATION

RUNOFF VOLUME	= Bureau of Reclamation
PEAK DISCHARGE	= SCS Unit Hydrograph

RAINFALL PARAMETERS

RAINFALL RETURN PERIOD	= 25.0 YEARS
RAINFALL DURATION	= 24.00 HOURS
RAINFALL AMOUNT	= 5.12 INCHES
TIME INTERVAL	= 0.10 HOURS
RAINFALL DISTRIBUTION	= SCS Type II

WATERSHED PARAMETERS

TOTAL WATERSHED AREA	= 32.3 ACRES (0.050 SQ MI)
SCS RUNOFF CURVE NUMBER	= 87.0
MINIMUM RETENTION RATE	= 0.065 INCHES/HOUR
TIME OF CONCENTRATION	= 0.56 HOURS

RAINFALL - RUNOFF SUMMARY

PEAK DISCHARGE	= 87.5 CFS
TIME TO PEAK (FROM START OF RAIN)	= 12.3 HOURS
RUNOFF VOLUME	= 8.2 ACRE-FEET

```
**************************************
*          AMAX DATA SYSTEMS         *
*  ENGINEERING SYSTEMS DEVELOPMENT   *
*      ENVIRONMENTAL ENGINEERING     *
*          RESERVOIR ROUTING         *
**************************************
```

RSROUT - Version 2.0I
FILE: BASINSP3 PRREPORT A

JANUARY 26, 1990

PROJ TITLE: PROPOSED SEDIMENT BASIN SP-3
SILTATIOPN CONTROL FOR PLANT AREA
LOCATION: AMAX COAL INDUSTRIES INC - PENNDIANA FLD
SULLIVAN COUNTY, INDIANA
RESERVOIR: SEDIMENT BASIN SP-3
PLANT AREA SEDIMENT CONTROL

RESERVOIR ROUTING - SUMMARY TABLE

(ALL TIMES ARE FROM START OF RAINFALL)

INFLOW PARAMETERS		
WATERSHED AREA	32.30	ACRES
RAINFALL RETURN PERIOD	25.00	YEARS
RAINFALL DURATION	24.00	HOURS
RAINFALL AMOUNT	5.12	INCHES
TIME AT START OF INFLOW	5.60	HOURS
PEAK INFLOW	87.52	CFS
TIME TO PEAK INFLOW	12.30	HOURS
INFLOW RUNOFF VOLUME	8.19	ACRE-FEET
TIME TO END OF INFLOW	20.60	HOURS
RESERVOIR PARAMETERS		
RESERVOIR ELEV. AT START OF STORM	550.00	FEET
NORMAL POOL ELEVATION	550.00	FEET
EMBANKMENT CREST ELEVATION	555.00	FEET
STORAGE VOLUME & DISCHARGE RATE AT:		
POOL ELEVATION AT STORM START:	10.49 AC-FT,	0.0 CFS
NORMAL POOL ELEVATION	10.49 AC-FT,	0.0 CFS
EMBANKMENT CREST ELEVATION	19.89 AC-FT,	1747.3 CFS
ROUTING SUMMARY		
PEAK RESERVOIR ELEVATION	551.04	FEET
TIME TO PEAK RESERVOIR ELEVATION	12.50	HOURS
OUTFLOW RATE AT PEAK ELEVATION	70.88	CFS
FREEBOARD AT PEAK ELEVATION	3.96	FEET
* TIME TO DRAWDOWN TO NORMAL POOL	8.20	HOURS
OUTFLOW RUNOFF VOLUME	8.20	ACRE-FEET
ROUTING TIME INCREMENT	0.10	HOURS

* NOTE: FROM TIME OF PEAK RESERVOIR ELEVATION

RSROUT - Version 2.0I
FILE: BASINSP3 STORAGE

JANUARY 26, 1990

PROJ TITLE: PROPOSED SEDIMENT BASIN SP-3
SILTATIOPN CONTROL FOR PLANT AREA
LOCATION: AMAX COAL INDUSTRIES INC - PENNDIANA FLD
SULLIVAN COUNTY, INDIANA
RESERVOIR: SEDIMENT BASIN SP-3
PLANT AREA SEDIMENT CONTROL

RESERVOIR ELEVATION VS SURFACE AREA AND STORAGE

RESERVOIR ELEVATION	SURFACE AREA	STORAGE CAPACITY
(FEET)	(ACRES)	(AC-FT)
540.00	0.00	0.00
542.00	0.73	0.73
545.00	1.16	3.57
550.00	1.61	10.49
555.00	2.15	19.89

RSROUT - Version 2.0I
FILE: BASINSP3 DISCHRGE A4 JANUARY 26, 1990

PROJ TITLE: PROPOSED SEDIMENT BASIN SP-3
SILTATIOPN CONTROL FOR PLANT AREA
LOCATION: AMAX COAL INDUSTRIES INC - PENNDIANA FLD
SULLIVAN COUNTY, INDIANA
RESERVOIR: SEDIMENT BASIN SP-3
PLANT AREA SEDIMENT CONTROL

OUTLET DEVICE: OPEN CHANNEL SPILLWAY - 10 FT BOTTOM

RESERVOIR ELEVATION VS. DISCHARGE

FIRST OUTLET DEVICE

RESERVOIR ELEVATION (FT)	DISCHARGE (CFS)
550.00	0.00
550.10	1.50
550.20	4.70
550.30	9.30
550.40	15.20
550.50	22.20
550.60	30.50
550.70	39.90
550.80	50.40
550.90	62.10
551.00	62.10
551.20	104.20
551.40	138.30
551.60	177.20
551.80	221.30
552.00	270.50
553.00	600.90
554.00	1086.50
555.00	1747.30

AMAX COAL INDUSTRIES

PENNDIANA MINE
SEDIMENT BASIN SP-3
LOCATION MAP

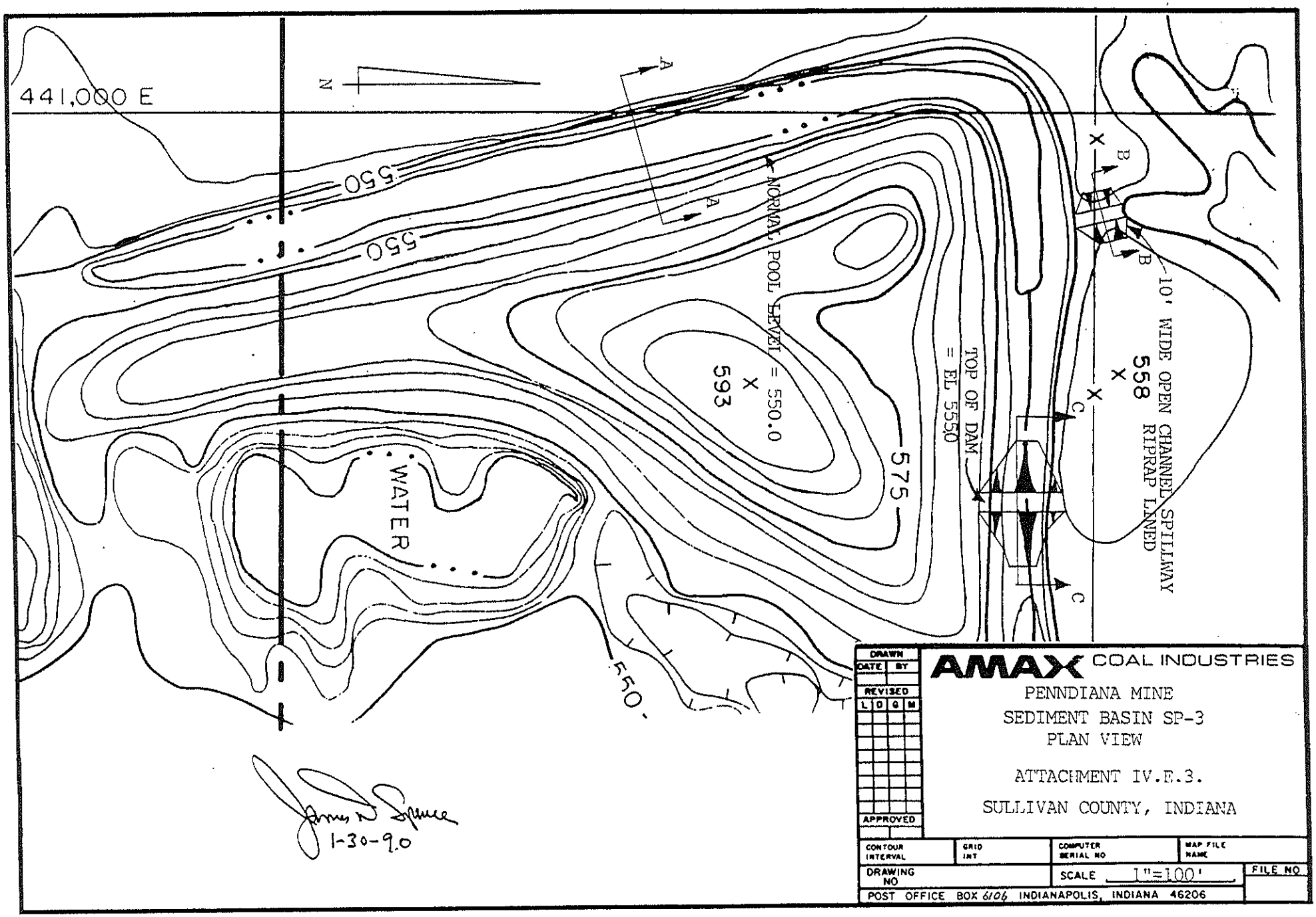
ATTACHMENT IV.E.3.

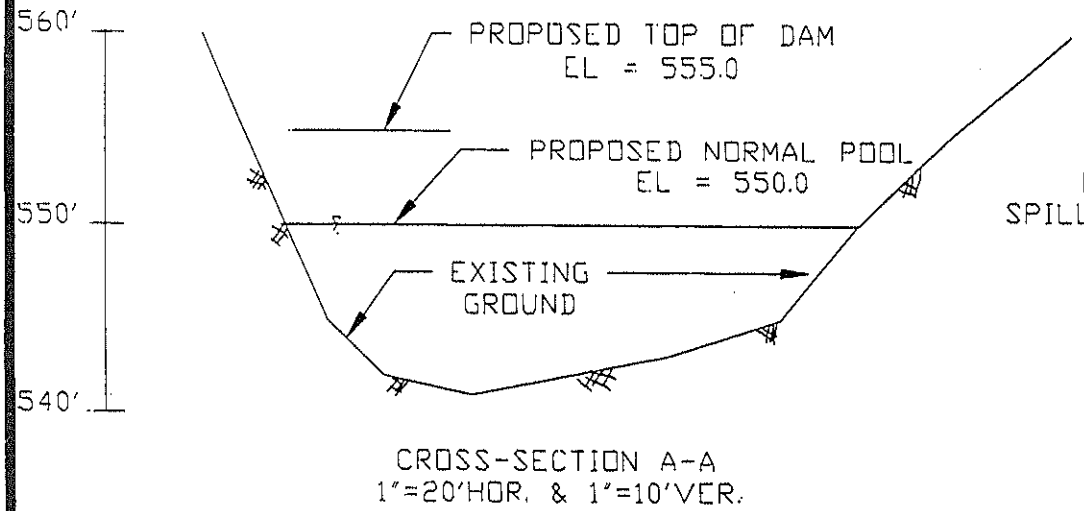
SULLIVAN COUNTY, INDIANA

1.30-90

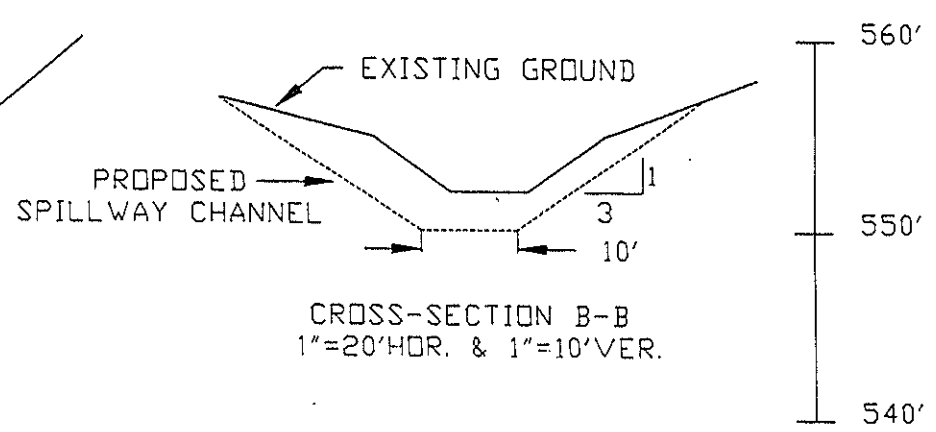
SCALE 1"=2000'

POST OFFICE BOX 6706 INDIANAPOLIS, INDIANA 46206

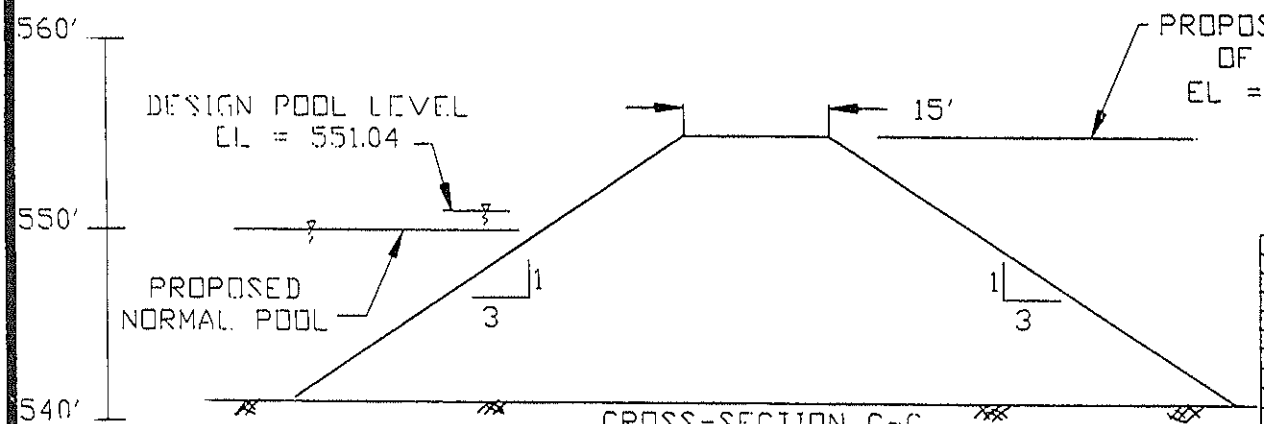

441,000 E
N
A
A
550
550
NORMAL POOL LEVEL = 550.0
593
575
WATER
550
TOP OF DAM
= EL 5550
B
B
B
10' WIDE OPEN CHANNEL SPILLWAY
RIPRAP LINED
558
C
C
James D Spence
1-30-90
DRAWN
DATE
BY
REVISED
L
D
G
M
APPROVED
AMAX COAL INDUSTRIES
PENNDIANA MINE
SEDIMENT BASIN SP-3
PLAN VIEW
ATTACHMENT IV.E.3.
SULLIVAN COUNTY, INDIANA
CONTOUR INTERVAL
GRID INT
COMPUTER SERIAL NO
MAP FILE NAME
DRAWING NO
SCALE 1"=100'
FILE NO
POST OFFICE BOX 6106 INDIANAPOLIS, INDIANA 46206



CROSS-SECTION A-A
1"=20'HOR. & 1"=10'VER.



CROSS-SECTION B-B
1"=20'HOR. & 1"=10'VER.



CROSS-SECTION C-C
1"=20'HOR. & 1"=10'VER.

James W Spence
1-30-90

DRAWN DATE BY	1/26/90 [illegible]
REVISED L D B M	
APPROVED	
DATA KEY	

AMAX Coal Industries AMAX

PENNDIANA MINE
PROPOSED SEDIMENT BASIN
SP-3
CROSS-SECTIONS

ATTACHMENT IV.E.3.
SULLIVAN COUNTY, INDIANA
2nd P.M.

CONTOUR INTERVAL	GRID INT.	COMPUTER SERIAL NO.	AUTOCAD FILE NAME: BASINSP3
DRAWING NO. PM-9003-03-EV		SCALE	FILE NO. 90-03

P.O. BOX 1306, INDIANAPOLIS, IN 46206-6106

APPENDIX D – EXHIBIT 2

Sediment Basin 044

Cell "A" and "B"

AS-BUILT

REVISED 2-25-2010

Farmersburg mine

Bear Run Pit

Permit S-256-2

25 Yr. 6 Hr. Storm Calculations

Ken Paul

Peabody Midwest

Phone: 812-434-8586
Email: kpaul@peabodyenergy.com

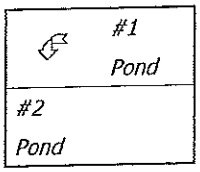
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 6 hr
Rainfall Depth:	3.800 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	#2	0.000	0.000	SB 044, CELL "A"
Pond	#2	==>	End	0.000	0.000	SB 044, CELL "B"



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	In	74.200	74.200	86.90	5.71
	Out			11.38	5.72
#2	In	418.940	493.140	373.71	46.06
	Out			179.78	46.06

Structure Detail:

Structure #1 (Pond)

SB 044, CELL "A"

Pond Inputs:

Initial Pool Elev:	547.40 ft
Initial Pool:	173.33 ac-ft

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
547.40	23.00	4.80:1	5.80:1	6.20

Pond Results:

Peak Elevation:	547.72 ft
Dewater Time:	2.05 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
505.00	0.430	0.000	0.000	
507.00	0.594	1.020	0.000	
509.00	0.782	2.392	0.000	
511.00	0.997	4.167	0.000	
513.00	1.239	6.398	0.000	
515.00	1.504	9.137	0.000	
517.00	1.799	12.435	0.000	
519.00	2.117	16.346	0.000	
521.00	2.462	20.921	0.000	
523.00	2.834	26.213	0.000	
525.00	3.230	32.273	0.000	
527.00	3.684	39.182	0.000	
529.00	4.164	47.025	0.000	
531.00	4.676	55.860	0.000	
533.00	5.216	65.747	0.000	
535.00	5.786	76.744	0.000	
537.00	6.387	88.912	0.000	
539.00	7.014	102.307	0.000	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
541.00	7.675	116.991	0.000		
543.00	8.362	133.023	0.000		
545.00	9.081	150.461	0.000		
547.00	9.828	169.365	0.000		
547.40	9.980	173.327	0.000		Spillway #1
547.72	10.322	176.671	11.379	45.65	Peak Stage
549.00	11.207	190.267	57.655		
550.00	12.010	201.873	171.633		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
505.00	0.000	0.000
507.00	0.000	0.000
509.00	0.000	0.000
511.00	0.000	0.000
513.00	0.000	0.000
515.00	0.000	0.000
517.00	0.000	0.000
519.00	0.000	0.000
521.00	0.000	0.000
523.00	0.000	0.000
525.00	0.000	0.000
527.00	0.000	0.000
529.00	0.000	0.000
531.00	0.000	0.000
533.00	0.000	0.000
535.00	0.000	0.000
537.00	0.000	0.000
539.00	0.000	0.000
541.00	0.000	0.000
543.00	0.000	0.000
545.00	0.000	0.000
547.00	0.000	0.000
547.40	0.000	0.000
549.00	57.655	57.655
550.00	171.633	171.633

Structure #2 (Pond)

SB 044, CELL "B"

Pond Inputs:

Initial Pool Elev:	519.40 ft
Initial Pool:	103.41 ac-ft

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
519.40	44.50	5.50:1	3.80:1	20.10

Pond Results:

Peak Elevation:	521.06 ft
Dewater Time:	0.15 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
472.00	0.100	0.000	0.000	
474.00	0.156	0.254	0.000	
476.00	0.223	0.631	0.000	
478.00	0.303	1.155	0.000	
480.00	0.394	1.850	0.000	
482.00	0.497	2.739	0.000	
484.00	0.612	3.847	0.000	
486.00	0.739	5.197	0.000	
488.00	0.880	6.814	0.000	
490.00	1.032	8.723	0.000	
492.00	1.196	10.948	0.000	
494.00	1.371	13.513	0.000	
496.00	1.559	16.442	0.000	
498.00	1.759	19.757	0.000	
500.00	1.970	23.484	0.000	
502.00	2.299	27.748	0.000	
504.00	2.653	32.695	0.000	
506.00	3.031	38.375	0.000	
508.00	3.436	44.838	0.000	
510.00	3.865	52.135	0.000	
512.00	4.320	60.316	0.000	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
514.00	5.087	69.713	0.000		
516.00	5.917	80.706	0.000		
518.00	6.808	93.421	0.000		
519.40	7.470	103.412	0.000		Spillway #1
520.00	7.858	108.010	65.000	0.86*	
521.06	8.587	117.047	179.780	2.85	Peak Stage
522.00	9.220	125.069	281.674		
523.00	9.870	134.612	549.049		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
472.00	0.000	0.000
474.00	0.000	0.000
476.00	0.000	0.000
478.00	0.000	0.000
480.00	0.000	0.000
482.00	0.000	0.000
484.00	0.000	0.000
486.00	0.000	0.000
488.00	0.000	0.000
490.00	0.000	0.000
492.00	0.000	0.000
494.00	0.000	0.000
496.00	0.000	0.000
498.00	0.000	0.000
500.00	0.000	0.000
502.00	0.000	0.000
504.00	0.000	0.000
506.00	0.000	0.000
508.00	0.000	0.000
510.00	0.000	0.000
512.00	0.000	0.000
514.00	0.000	0.000
516.00	0.000	0.000
518.00	0.000	0.000
519.40	0.000	0.000

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
520.00	65.000	65.000
522.00	281.674	281.674
523.00	549.049	549.049

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	74.200	0.174	0.000	0.000	69.000	M	86.90	5.712
	Σ	**74.200**						**86.90**	**5.712**
#2	1	418.940	0.631	0.000	0.000	74.000	M	364.68	40.338
	Σ	**493.140**						**373.71**	**46.058**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	2.60	13.00	500.00	1.280	0.108
		8. Large gullies, diversions, and low flowing streams	2.71	32.00	1,180.00	4.940	0.066
#1	**1**	**Time of Concentration:**					**0.174**
#2	1	4. Cultivated, straight row	2.20	11.00	500.00	1.320	0.105
		8. Large gullies, diversions, and low flowing streams	1.04	60.00	5,782.00	3.050	0.526
#2	**1**	**Time of Concentration:**					**0.631**

25-Feb-10

Sediment Basin Design Summary

I. General Information

Mine:	Bear Run Pit, Permit #256-2
Basin:	SB 044 CELL "B" As-built
Basin Type:	Incised
Examination Exempt:	Yes

II. Design Parameters:

Design Storm Event : (10yr/24hr)	4.45
Runoff Area (RA) (Treatment and Detention)	418.94
Runoff Coefficient (RC)	0.52

III. Runoff Calculation:

RV = RE (in / 24hr) * 1ft/12 in * Runoff Area (ac) * 43,560 sq ft /ac * RC

where: RV = runoff volume (cubic ft/24hr)
RE = runoff design event (inches/24hr)
RC = runoff coefficient

RV = 3497730 cubic ft /24hr 80.30 acre ft

IV. Treatment Volume Calculation:

Detention Time: DT	10 hours
Sediment Volume: SV	210427 cubic ft
Pit Pumpage Volume: PV	500 gpm

MCV = RV cf / 24hr * 1day/24hr * DT hr + PV gpm
* 1440 min/day * 1day/24hr *0.1337 cf/gal * DT hr + SV cf

Minimum Compliance volume= 1707692 cubic ft 39.20 acre ft

Basin Freeboard:	2.0 ft minimum at pool	
Basin Surface area:	7.47 acres	325393 sq ft
Basin Minimum Average depth	5.25 ft	

Sediment Basin Design:

25-Feb-10

Universal Soil Loss Calculation:

Mine: Bear Run Pit, Permit #256-2 **Basin:** SB 044 CELL "B" As-built

Soil Loss per Unit Area:

A= R * K * LS*CP A = 9.04 tons/acre

where: A = Soil loss per acre (tons/acre)

R = Rainfall-Erosivity Factor	200
K = Soil Erodibility Factor	0.43
LS = Length Slope Factor	0.47
CP = Cropping Practice Factor	0.22

LS Factor Calculation

LS = (FSL/72.6)^m * ((430x^2 + 30x + 0.43) / 6.613)) 0.47

where: FSL = Field Slope Length 6282.00

x = Field Slope Ratio 0.0113

m = slope factor 0.3

slope < 3% m=0.3 , = 4% m=0.4, >5% m=0.5

CP Weighted Factor Calculation

Ground Cover Description	CP Value	Area (ac)	CP*ac	
Active Disturbed area	0.90	67.94	61.15	
Reclaimed or Undisturbed	0.09	351.00	31.59	Weighted CP
		418.94	92.74	0.22

Sediment Delivery Ratio:

D = Da * Dv * Dc * Dp D= 0.25

where: D = sediment delivery ratio	0.25
Da = area delivery ratio	0.50
Dv = Vegetation trapping factor	1.00
Dc = Channelization factor	0.50
Dp = pit deposition factor	1.00

Sediment Yield From Design Watershed:

Y = A * D Y= 2.26 tons/acre

where: Y = Watershed Sediment Yield (Tons / Acre)

A = Soil loss per area (Tons / Acre)

D = Sediment Delivery Ratio

Life of Basin 10.0 years

Sediment Yield Conversion Ac ft / ac year:

Y2 (ac ft/ ac yr) =(Y t/ac * 2000 lb/t) / (90 lb/cubic ft * 43560 sq ft / ac)

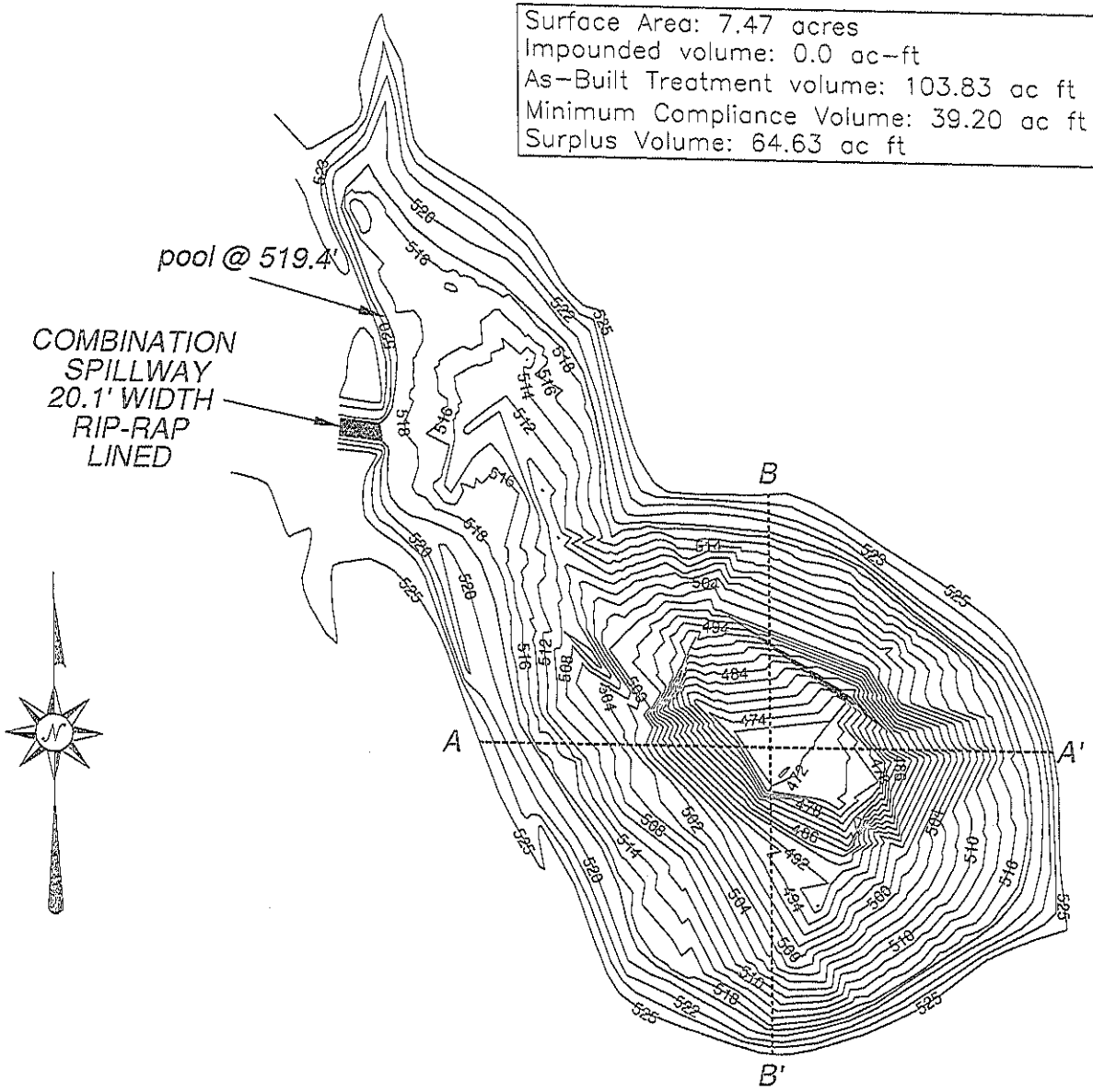
Y2= 0.00115 ac ft / ac yr

Sediment Storage Calculation:

SL = RA * Y2 * YR * 43560 **Design Sediment Storage =** 210427 cubic ft

SB 044 Cell "B" As-Built Volume Summary

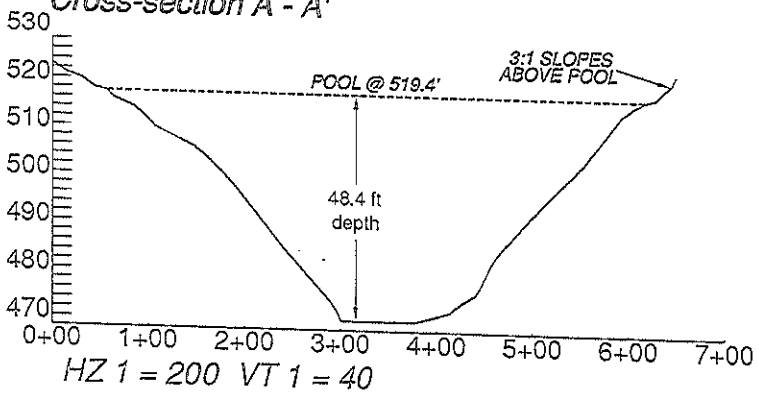
Surface Area: 7.47 acres
Impounded volume: 0.0 ac-ft
As-Built Treatment volume: 103.83 ac ft
Minimum Compliance Volume: 39.20 ac ft
Surplus Volume: 64.63 ac ft



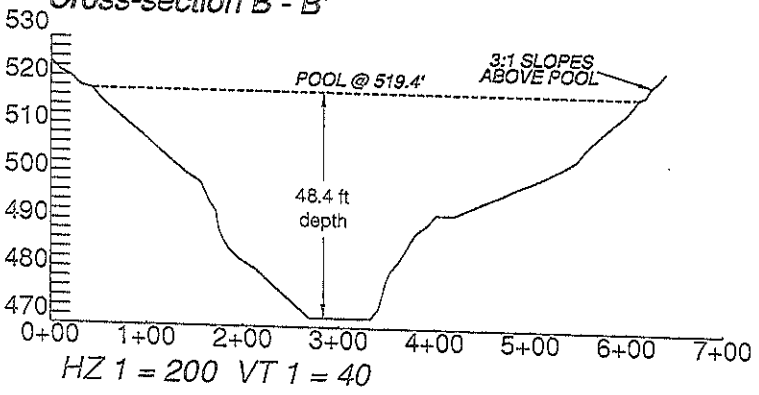
HOR. 1" = 200'

Black Beauty Coal Company	DATE: 2-25-2010	REVISION NO.: DATE:
Sediment Control Basin SB 044 Cell "B" As-Built Plan View Farmersburg Mine, Bear Run East Pit, Permit #256-2	SCALE: 1 in = 200 ft SHEET 1 OF 2	NOTES: Surveyed by Donnie Oxidine

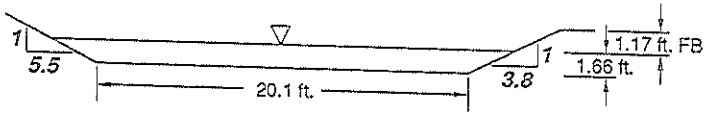
Cross-section A - A'



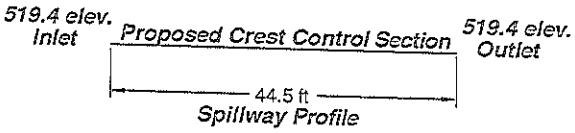
Cross-section B - B'



Basin SB 044 Cell "B" As-Built Combination Spillway



Emergency Spillway @ 519.4'
Channel Lining: 6 inch Rock Rip-Rap



Spillway Profile

NOT TO SCALE

BRIAN D. BUTTS
REGISTERED
10707734
STATE OF INDIANA
PROFESSIONAL ENGINEER

Brian D. Butts
2/25/10

Black Beauty Coal Company	DATE: 2-25-2010	REVISION NO.: DATE:
Sediment Control Basin SB 044 Cell "B" As-built Cross-sections and Spillway Section Farmersburg Mine, Bear Run East Pit, Permit #256-2	SCALE: As-Noted	NOTES: Surveyed by Donnie Oxidine
	SHEET 2 OF 2	

APPENDIX D – EXHIBIT 3

Sediment Basin 058

As-built

Bear Run Mine

Permit S-256

25 Yr. 6 Hr. Storm Calculations

Ken Paul

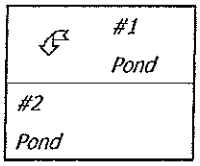
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 6 hr
Rainfall Depth:	3.800 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	#2	0.000	0.000	SB 058 CELL "B"
Pond	#2	==>	End	0.000	0.000	SB 058 CELL "A"



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	In	28.400	28.400	48.05	3.18
	Out			33.28	3.18
#2	In	65.400	93.800	141.65	10.52
	Out			53.79	10.52

Structure Detail:

Structure #1 (Pond)

SB 058 CELL "B"

Pond Inputs:

Initial Pool Elev:	581.00 ft
Initial Pool:	3.40 ac-ft

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
581.00	20.00	3.50:1	2.90:1	11.80

Pond Results:

Peak Elevation:	581.57 ft
Dewater Time:	0.20 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
575.00	0.220	0.000	0.000		
577.00	0.403	0.614	0.000		
578.00	0.510	1.070	0.000		
579.00	0.680	1.663	0.000		
581.00	1.070	3.397	0.000		Spillway #1
581.57	1.187	4.112	33.282	4.75	Peak Stage
583.00	1.470	5.927	117.738		

Detailed Discharge Table

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
575.00	0.000	0.000
577.00	0.000	0.000
578.00	0.000	0.000
579.00	0.000	0.000

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
581.00	0.000	0.000
583.00	117.738	117.738

Structure #2 (Pond)

SB 058 CELL "A"

Pond Inputs:

Initial Pool Elev:	573.60 ft
Initial Pool:	13.70 ac-ft

Straight Pipe

Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Entrance Loss Coefficient	Tailwater Depth (ft)
24.00	80.00	16.60	0.0150	573.60	0.90	0.00

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
574.60	38.00	6.40:1	4.60:1	14.70

Pond Results:

Peak Elevation:	575.44 ft
Dewater Time:	0.40 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
559.00	0.040	0.000	0.000	
560.00	0.380	0.181	0.000	
561.00	0.438	0.590	0.000	
563.00	0.563	1.589	0.000	
565.00	0.704	2.853	0.000	
567.00	0.860	4.415	0.000	
569.00	1.165	6.432	0.000	
571.00	1.514	9.103	0.000	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
573.00	1.907	12.516	0.000		
573.60	2.030	13.697	0.000		Spillway #1
574.60	2.415	15.916	4.189	6.41*	Spillway #2
575.00	2.573	16.914	27.365	2.25	
575.44	2.762	18.149	53.793	1.05	Peak Stage
576.00	2.990	19.693	86.826		
576.50	3.200	21.240	150.607		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Straight Pipe (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
559.00	0.000	0.000	0.000
560.00	0.000	0.000	0.000
561.00	0.000	0.000	0.000
563.00	0.000	0.000	0.000
565.00	0.000	0.000	0.000
567.00	0.000	0.000	0.000
569.00	0.000	0.000	0.000
571.00	0.000	0.000	0.000
573.00	0.000	0.000	0.000
573.60	0.000	0.000	0.000
574.60	(3)>4.189	0.000	4.189
575.00	(3)>6.942	20.422	27.365
576.00	(4)>15.350	71.475	86.826
576.50	(5)>18.875	131.732	150.607

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	28.400	0.175	0.000	0.000	77.000	M	48.05	3.181
	Σ	**28.400**						**48.05**	**3.181**
#2	1	65.400	0.132	0.000	0.000	77.000	M	112.32	7.339
	Σ	**93.800**						**141.65**	**10.520**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	4. Cultivated, straight row	2.40	12.00	500.00	1.380	0.100
		8. Large gullies, diversions, and low flowing streams	1.76	19.00	1,080.00	3.970	0.075
#1	**1**	**Time of Concentration:**					**0.175**
#2	1	4. Cultivated, straight row	3.38	11.00	325.00	1.640	0.055
		8. Large gullies, diversions, and low flowing streams	3.36	51.40	1,532.00	5.490	0.077
#2	**1**	**Time of Concentration:**					**0.132**

Sediment Basin Design Summary

27-Feb-12

I. General Information

Mine:	Bear Run Pit, Permit #256-4
Basin:	SB 058 As-built
Basin Type:	Incised
Examination Exempt:	Yes

II. Design Parameters:

Design Storm Event : (10yr/24hr)	4.45
Runoff Area (RA) (Treatment and Detention)	93.80
Runoff Coefficient (RC)	0.52

III. Runoff Calculation:

RV = RE (in / 24hr) * 1ft/12 in * Runoff Area (ac) * 43,560 sq ft /ac * RC

where: RV = runoff volume (cubic ft/24hr)
RE = runoff design event (inches/24hr)
RC = runoff coefficient

RV = 783136 cubic ft /24hr 17.98 acre ft

IV. Treatment Volume Calculation:

Detention Time: DT	10 hours
Sediment Volume: SV	315078 cubic ft
Pit Pumpage Volume: PV	500 gpm

MCV = RV cf / 24hr * 1day/24hr * DT hr + PV gpm
* 1440 min/day * 1day/24hr *0.1337 cf/gal * DT hr + SV cf

Minimum Compliance volume= 681443 cubic ft 15.64 acre ft

Basin Freeboard:	2.0 ft minimum at pool	
Basin Surface area:	3.10 acres	135036 sq ft
Basin Minimum Average depth	5.05 ft	

Sediment Basin Design:
Universal Soil Loss Calculation:

27-Feb-12

Mine: Bear Run Pit, Permit #256-4 **Basin:** SB 058 As-built

Soil Loss per Unit Area:

A= R * K * LS*CP A = 120.93 tons/acre

where: A = Soil loss per acre (tons/acre)

R = Rainfall-Erosivity Factor 200

K = Soil Erodibility Factor 0.43

LS = Length Slope Factor 3.23

CP = Cropping Practice Factor 0.44

LS Factor Calculation

LS = (FSL/72.6)^m * ((430x^2 + 30x + 0.43) / 6.613)) 3.23

where: FSL = Field Slope Length 1857.00

x = Field Slope Ratio 0.0653

m = slope factor 0.5

slope < 3% m=0.3 , = 4% m=0.4, >5% m=0.5

CP Weighted Factor Calculation

Ground Cover Description	CP Value	Area (ac)	CP*ac	
Active Disturbed area	0.90	40.00	36.00	
Reclaimed or Undisturbed	0.09	53.80	4.84	Weighted CP
		93.80	40.84	0.44

Sediment Delivery Ratio:

D = Da * Dv * Dc * Dp D= 0.25

where: D = sediment delivery ratio 0.25

Da = area delivery ratio 0.50

Dv = Vegetation trapping factor 1.00

Dc = Channelization factor 0.50

Dp = pit deposition factor 1.00

Sediment Yield From Design Watershed:

Y = A * D Y= 30.23 tons/acre

where: Y = Watershed Sediment Yield (Tons / Acre)

A = Soil loss per area (Tons / Acre)

D = Sediment Delivery Ratio

Life of Basin 5.0 years

Sediment Yield Conversion Ac ft / ac year:

Y2 (ac ft/ ac yr) =(Y t/ac * 2000 lb/t) / (90 lb/cubic ft * 43560 sq ft / ac)

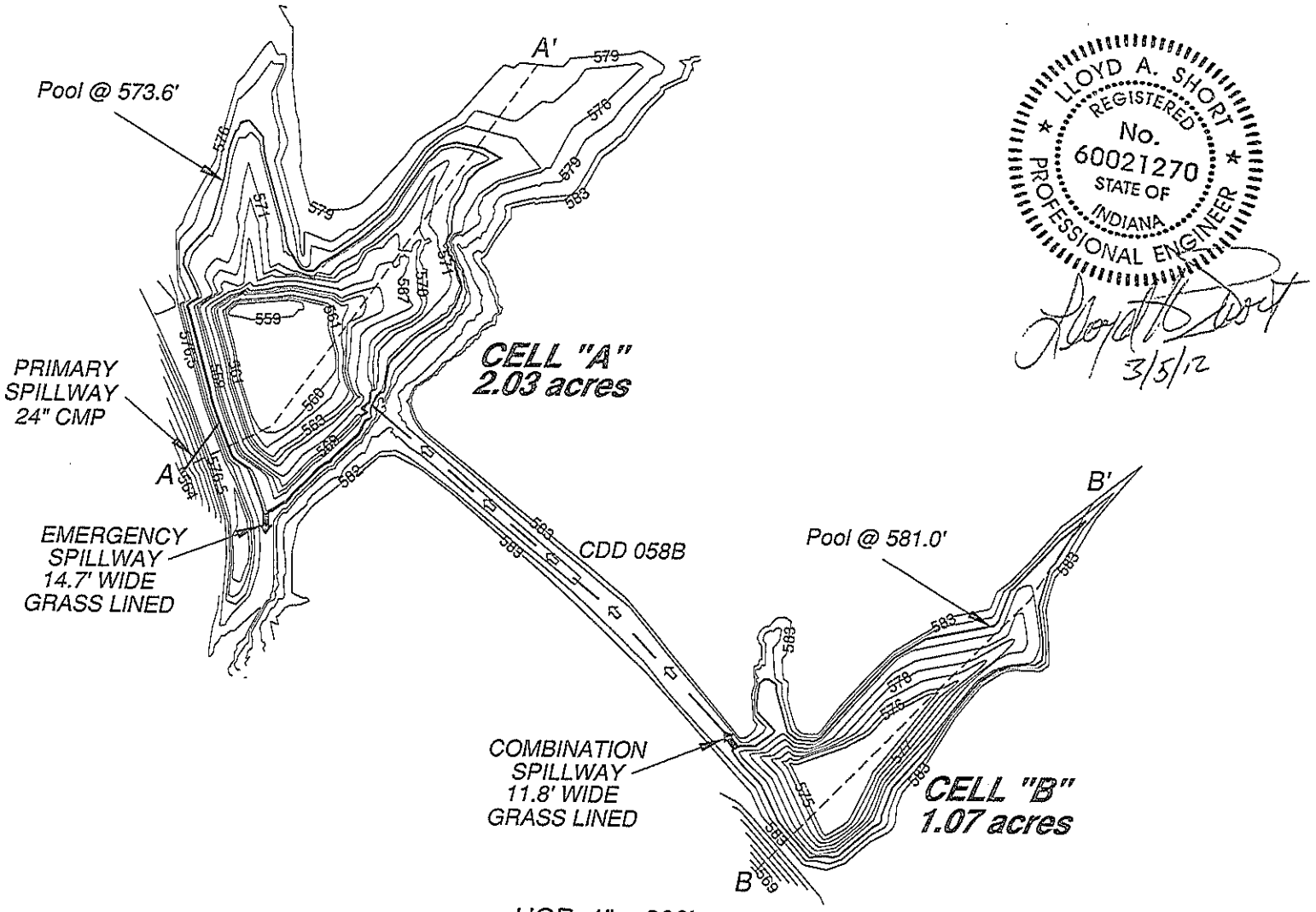
Y2= 0.01542 ac ft / ac yr

Sediment Storage Calculation:

SL = RA * Y2 * YR * 43560 **Design Sediment Storage =** 315078 cubic ft

SB 058 Cell "A" and Cell "B" As-built Volume Summary

Surface Area: Cell "A" 2.03 ac., Cell "B" 1.07 ac.
Impounded volume: Cell "A" 5.20 ac ft, Cell "B" 3.30 ac ft
As-built Treatment volume: Cell "A" and "B" 16.49 ac ft
Minimum Compliance Volume: Cell "A" and "B" 15.64 ac ft
Surplus Volume: 0.85 ac ft



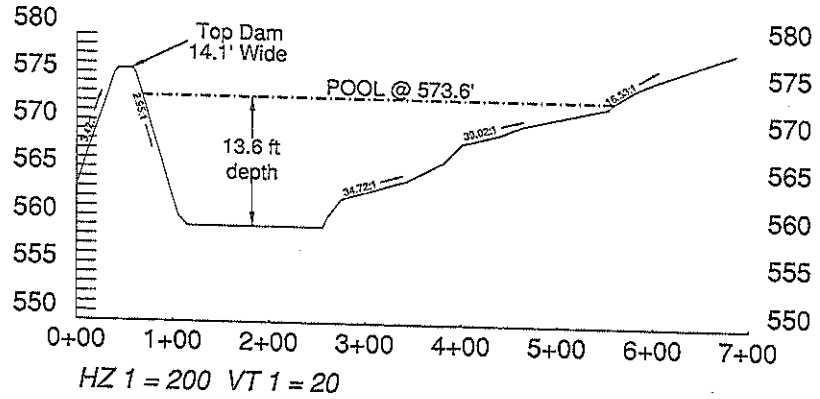
LLOYD A. SHORT
REGISTERED
No. 60021270
STATE OF INDIANA
PROFESSIONAL ENGINEER

3/5/12

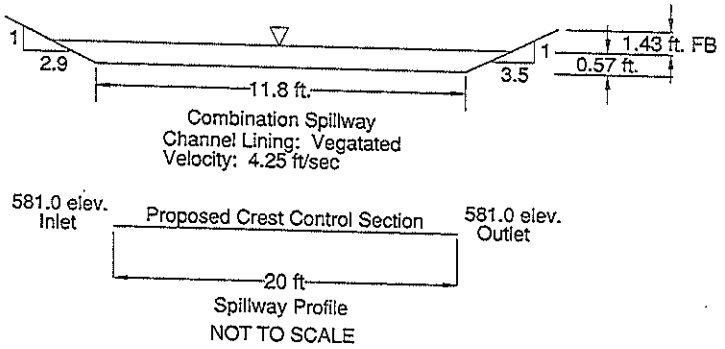
HOR. 1" = 200'

Peabody Midwest Mining LLC	DATE: 2-23-2012	REVISION NO.: DATE:
Sediment Control Basin SB 058, Cell "A" and Cell "B" As-built Plan View Bear Run Mine, Permit #256	SCALE: 1 in = 100 ft	NOTES:
	SHEET 1 OF 2	

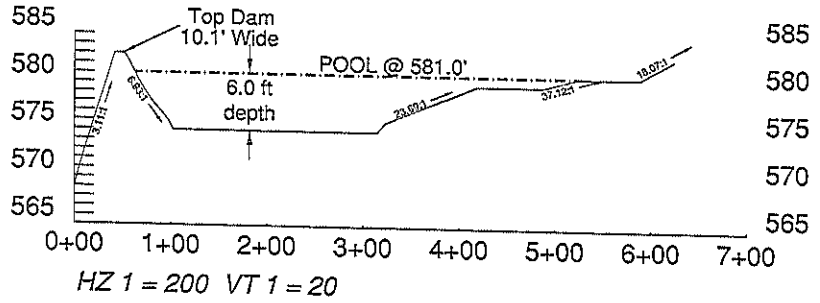
Cross-section A - A'



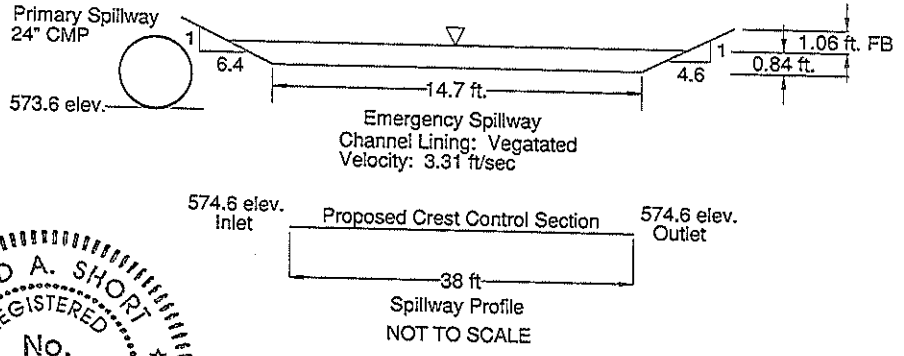
Basin SB 058, Cell "B"
Combination Spillway



Cross-section B - B'



Basin SB 058, Cell "A"
Emergency and Primary Spillway



LLOYD A. SHORT
REGISTERED
No.
60021270
STATE OF
INDIANA
PROFESSIONAL ENGINEER

3/5/12

Peabody Midwest Mining LLC	DATE: 2-23-2012	REVISION NO.: DATE:
Sediment Control Basin SB 058, Cell "A" and Cell "B" As-built Cross-sections and Spillway Section Bear Run Mine, Permit #256-4	SCALE: As-Noted	NOTES:
	SHEET 2 OF 2	

APPENDIX D – EXHIBIT 4

PEABODY MIDWEST MINING, LLC
IMPOUNDMENT EXAMINATION EXEMPTION REQUEST

MINE NAME Bear Run Mine

PERMIT NUMBER S-256-4

IMPOUNDMENT ID SB 062

The above referenced impoundment is exempt from the annual examination and certification requirements under 312 IAC 25-6-20-(a)(9)E)because of the following: 1) The structure is maintained as designed and in accordance with 312 IAC 25-6-20, 2) No appearance(s) of instability, structural weakness or other hazardous conditions have been observed and 3) The structure does not create a potential threat to public health and safety or threaten significant environmental harm.

Specific Exemption:

X Incised Impoundment

_____ Impounding Structure < 5 ft above upstream toe, < 20 ac/ft storage volume.

_____ Impoundment which does not facilitate mining or reclamation:

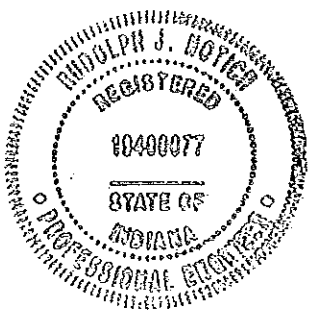
Sewage lagoons
Landscaping pond
Pool or wetland in replaced stream channel
Existing impoundment not yet used to facilitate mining
Ephemeral water body
Active mining pit
Differential settlement pool

Note: Impoundment previously Identified as FCI #1 under S-00010 and was certified as-built in 4/6/98 approved NSIG#154 of permit S-00010 as well as exempted from quarterly examination and annual recertification. The impoundment has not been altered from its original configuration.

Rudolph J. Notich, P.E. 19400077

Date: 7-7-11

SEAL:



Sediment Basin Design Summary

09-Jun-09

I. General Information

Mine:	Bear Run Pit, Permit #256-4
Basin:	SB 062
Basin Type:	Incised
Examination Exempt:	Yes

II. Design Parameters:

Design Storm Event : (10yr/24hr)	4.45
Runoff Area (RA) (Treatment and Detention)	503.00
Runoff Coefficient (RC)	0.52

III. Runoff Calculation:

RV = RE (in / 24hr) * 1ft/12 in * Runoff Area (ac) * 43,560 sq ft /ac * RC

where: RV = runoff volume (cubic ft/24hr)
RE = runoff design event (inches/24hr)
RC = runoff coefficient

RV = 4199547 cubic ft /24hr 96.41 acre ft

IV. Treatment Volume Calculation:

Detention Time: DT	10 hours
Sediment Volume: SV	1536499 cubic ft
Pit Pumpage Volume: PV	500 gpm

MCV = RV cf / 24hr * 1day/24hr * DT hr + PV gpm
* 1440 min/day * 1day/24hr *0.1337 cf/gal * DT hr + SV cf

Minimum Compliance volume= 3326141 cubic ft 76.36 acre ft

Basin Freeboard:	2.0 ft minimum at pool	
Basin Surface area:	35.50 acres	1546380 sq ft
Basin Minimum Average depth	2.15 ft	

Sediment Basin Design:
Universal Soil Loss Calculation:

06-Jun-09

Mine: Bear Run Pit, Permit #256-4 **Basin:** SB 062

Soil Loss per Unit Area:

A= R * K * LS*CP A = 109.97 tons/acre

where: A = Soil loss per acre (tons/acre)

R = Rainfall-Erosivity Factor	200
K = Soil Erodibility Factor	0.43
LS = Length Slope Factor	5.84
CP = Cropping Practice Factor	0.22

LS Factor Calculation

LS = (FSL/72.6)^m * ((430x^2 + 30x + 0.43) / 6.613)) 5.84

where: FSL = Field Slope Length	4019.00
x = Field Slope Ratio	0.0760
m = slope factor	0.5

slope < 3% m=0.3 , = 4% m=0.4, >5% m=0.5

CP Weighted Factor Calculation

Ground Cover Description	CP Value	Area (ac)	CP*ac	
Active Disturbed area	0.90	80.00	72.00	
Reclaimed or Undisturbed	0.09	423.00	38.07	Weighted CP
		503.00	110.07	0.22

Sediment Delivery Ratio:

D = Da * Dv * Dc * Dp D= 0.25

where: D = sediment delivery ratio	0.25
Da = area delivery ratio	0.50
Dv = Vegetation trapping factor	1.00
Dc = Channelization factor	0.50
Dp = pit deposition factor	1.00

Sediment Yield From Design Watershed:

Y = A * D Y= 27.49 tons/acre

where: Y = Watershed Sediment Yield (Tons / Acre)

A = Soil loss per area (Tons / Acre)

D = Sediment Delivery Ratio

Life of Basin 5.0 years

Sediment Yield Conversion Ac ft / ac year:

Y2 (ac ft/ ac yr) =(Y t/ac * 2000 lb/t) / (90 lb/cubic ft * 43560 sq ft / ac)

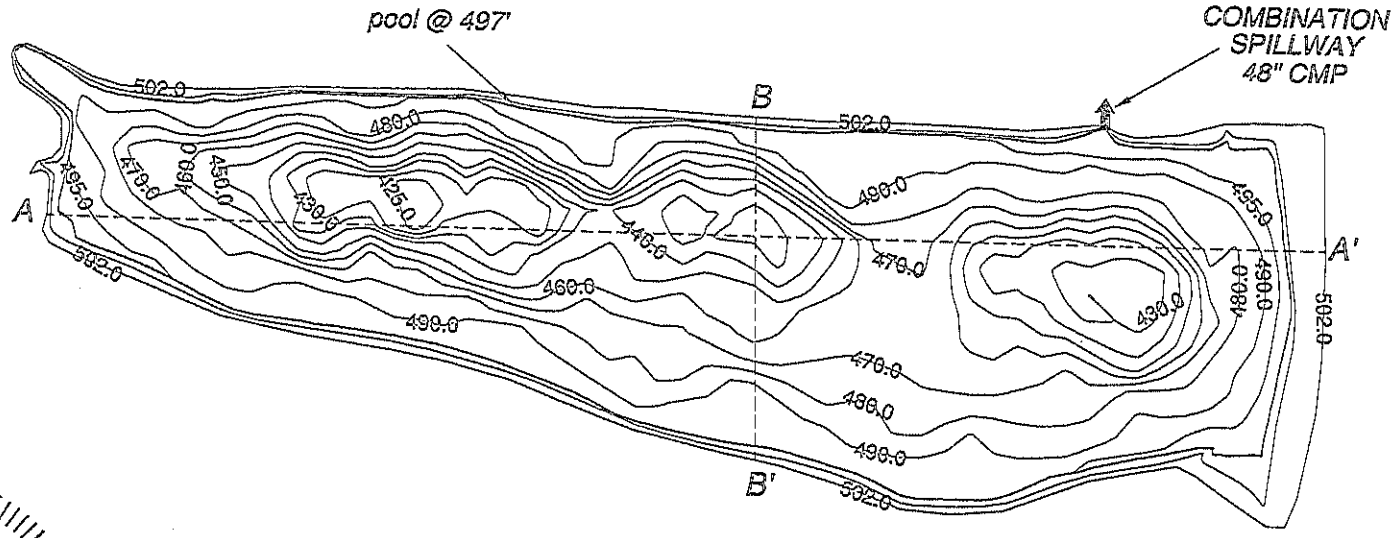
Y2= 0.01403 ac ft / ac yr

Sediment Storage Calculation:

SL = RA * Y2 * YR * 43560 **Design Sediment Storage =** 1536499 cubic ft

SB 062 D(n Volume Summary

Surface Area:	35.5 acres
Impounded volume:	0.0 ac ft
Design Treatment volume:	942.43 ac ft
Minimum Compliance Volume:	76.36 ac ft
Surplus Volume:	866.07 ac ft

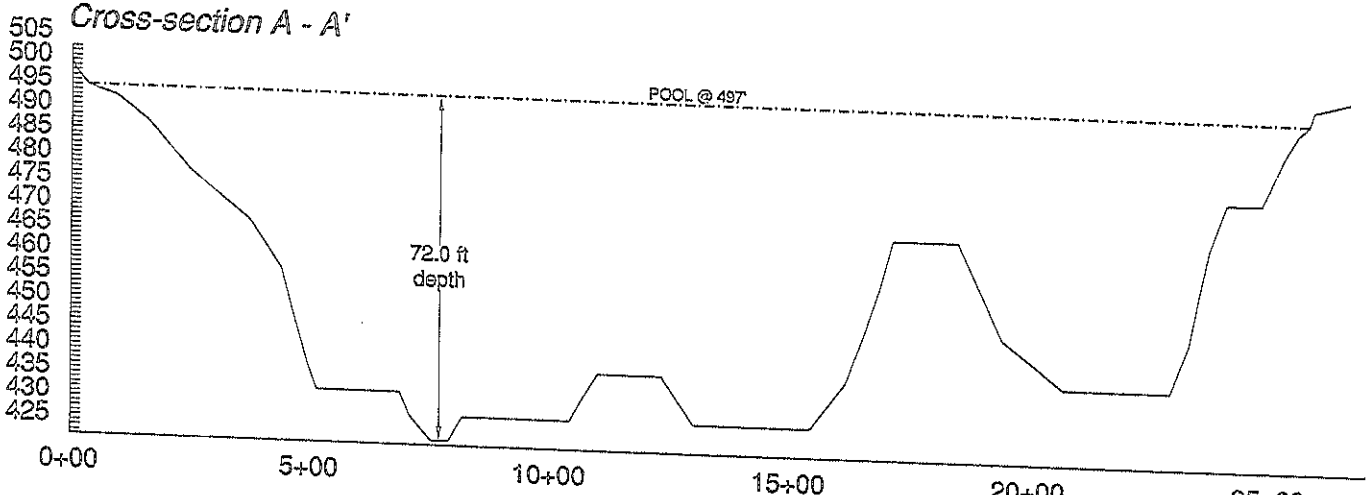


RUDOLPH J NOTICH
REGISTERED
No. 19400077
PROFESSIONAL ENGINEER
INDIANA
6-12-09

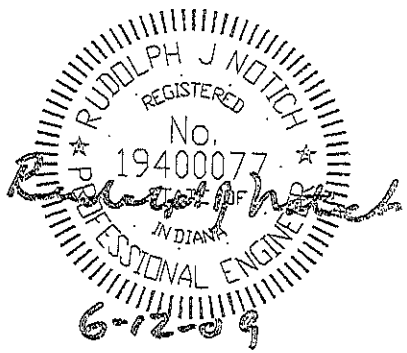
HOR. 1" = 400'

Black Beauty Coal Company	DATE: 6-3-2009	REVISION NO.: DATE:
Sediment Control Basin SB 062 Plan View Bear Run Mine, Permit #256-4	SCALE: 1 in = 400 ft	NOTES:
	SHEET 1 OF 2	

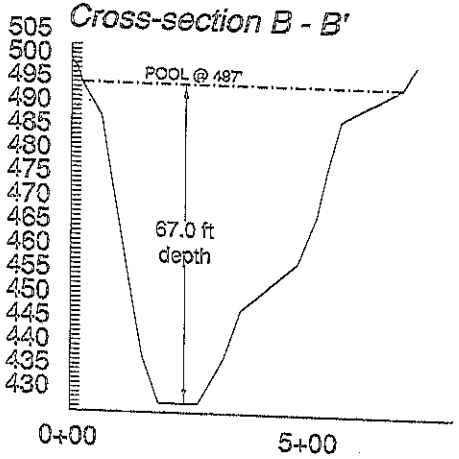
Cross-section A - A'



HZ 1 = 400 VT 1 = 40

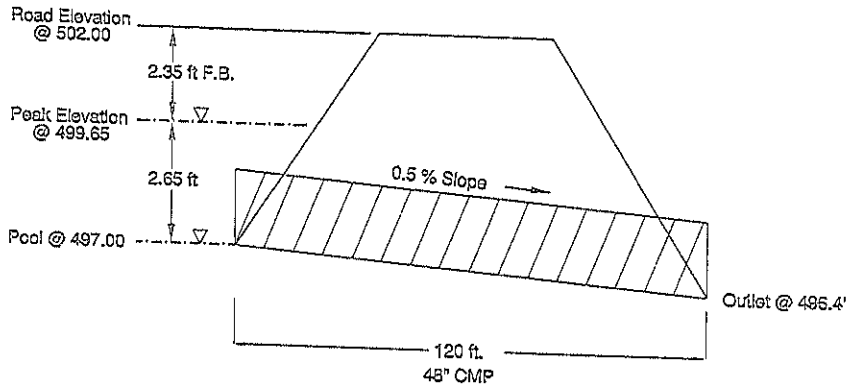


Cross-section B - B'



HZ 1 = 400 VT 1 = 40

SB 062
Combination Spillway



NOT TO SCALE

Black Beauty Coal Company	DATE: 6-3-2009	REVISION NO.: DATE:
Sediment Control Basin SB 062 Cross-sections and Spillway Section Bear Run Mine, Permit #256-4	SCALE: As-Noted	NOTES:
	SHEET 2 OF 2	

APPENDIX D – EXHIBIT 5

Sediment Basin 053
Cell "A"

Bear Run Mine

Permit S-256

25 Yr. 6 Hr. Storm Calculations

Ken Paul

Peabody Midwest

Phone: 812-434-8586
Email: Kpaul@peabodyenergy.com

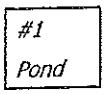
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 6 hr
Rainfall Depth:	3.800 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	End	0.000	0.000	SB 053 Cell "A"



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	In	493.000	493.000	659.02	59.01
	Out			76.32	58.09

Structure Detail:

Structure #1 (Pond)

SB 053 Cell "A"

Pond Inputs:

Initial Pool Elev:	520.00 ft
Initial Pool:	658.24 ac-ft

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
520.00	20.00	3.00:1	3.00:1	12.00

Pond Results:

Peak Elevation:	521.40 ft
Dewater Time:	0.66 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
475.00	0.540	0.000	0.000	
477.00	1.737	2.164	0.000	
479.00	3.610	7.398	0.000	
480.00	4.800	11.589	0.000	
481.00	5.359	16.666	0.000	
483.00	6.568	28.572	0.000	
485.00	7.900	43.020	0.000	
487.00	8.755	59.668	0.000	
489.00	9.651	78.067	0.000	
491.00	10.592	98.304	0.000	
493.00	11.577	120.466	0.000	
495.00	12.603	144.639	0.000	
497.00	13.677	170.912	0.000	
499.00	14.792	199.374	0.000	
501.00	15.951	230.110	0.000	
503.00	17.155	263.210	0.000	
505.00	18.400	298.758	0.000	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
507.00	19.784	336.934	0.000		
509.00	21.219	377.928	0.000		
511.00	22.703	421.841	0.000		
513.00	24.237	468.772	0.000		
515.00	25.821	518.822	0.000		
517.00	27.455	572.090	0.000		
519.00	29.139	628.676	0.000		
520.00	30.000	658.245	0.000		Spillway #1
521.00	30.579	688.534	31.357	11.69*	
521.40	30.816	700.870	76.325	4.05	Peak Stage
523.00	31.753	750.862	258.549		
525.00	32.950	815.562	721.469		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
475.00	0.000	0.000
477.00	0.000	0.000
479.00	0.000	0.000
480.00	0.000	0.000
481.00	0.000	0.000
483.00	0.000	0.000
485.00	0.000	0.000
487.00	0.000	0.000
489.00	0.000	0.000
491.00	0.000	0.000
493.00	0.000	0.000
495.00	0.000	0.000
497.00	0.000	0.000
499.00	0.000	0.000
501.00	0.000	0.000
503.00	0.000	0.000
505.00	0.000	0.000
507.00	0.000	0.000
509.00	0.000	0.000
511.00	0.000	0.000
513.00	0.000	0.000

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
515.00	0.000	0.000
517.00	0.000	0.000
519.00	0.000	0.000
520.00	0.000	0.000
521.00	31.357	31.357
523.00	258.549	258.549
525.00	721.469	721.469

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	493.000	0.445	0.000	0.000	79.000	M	659.02	59.013
	Σ	**493.000**						**659.02**	**59.013**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	4. Cultivated, straight row	4.00	20.00	500.00	1.780	0.078
		8. Large gullies, diversions, and low flowing streams	1.85	100.00	5,405.11	4.080	0.367
#1	**1**	**Time of Concentration:**					**0.445**

05-Mar-11

Sediment Basin Design Summary

I. General Information

Mine:	Bear Run Pit, Permit #256-4
Basin:	SB 053 cell "A"
Basin Type:	Incised
Examination Exempt:	Yes

II. Design Parameters:

Design Storm Event : (10yr/24hr)	4.45
Runoff Area (RA) (Treatment and Detention)	493.00
Runoff Coefficient (RC)	0.52

III. Runoff Calculation:

RV = RE (in / 24hr) * 1ft/12 in * Runoff Area (ac) * 43,560 sq ft /ac * RC

where: RV = runoff volume (cubic ft/24hr)
RE = runoff design event (inches/24hr)
RC = runoff coefficient

RV = 4116057 cubic ft /24hr 94.49 acre ft

IV. Treatment Volume Calculation:

Detention Time: DT	10 hours
Sediment Volume: SV	2267880 cubic ft
Pit Pumpage Volume: PV	500 gpm

MCV = RV cf / 24hr * 1day/24hr * DT hr + PV gpm
* 1440 min/day * 1day/24hr *0.1337 cf/gal * DT hr + SV cf

Minimum Compliance volume= 4022739 cubic ft 92.35 acre ft

Basin Freeboard:	2.0 ft minimum at pool	
Basin Surface area:	30.00 acres	1306800 sq ft
Basin Minimum Average depth	3.08 ft	

05-Mar-11

Sediment Basin Design:
Universal Soil Loss Calculation:

Mine: Bear Run Pit, Permit #256-4 **Basin:** SB 053 cell "A"

Soil Loss per Unit Area:

A= R * K * LS*CP A = 165.61 tons/acre

where: A = Soil loss per acre (tons/acre)

R = Rainfall-Erosivity Factor	200
K = Soil Erodibility Factor	0.43
LS = Length Slope Factor	5.72
CP = Cropping Practice Factor	0.34

LS Factor Calculation

LS = (FSL/72.6)^m * ((430x^2 + 30x + 0.43) / 6.613)) 5.72

where: FSL = Field Slope Length	5905.00
x = Field Slope Ratio	0.0650
m = slope factor	0.5

slope < 3% m=0.3 , = 4% m=0.4, >5% m=0.5

CP Weighted Factor Calculation

Ground Cover Description	CP Value	Area (ac)	CP*ac	
Active Disturbed area	0.90	150.00	135.00	
Reclaimed or Undisturbed	0.09	343.00	30.87	Weighted CP
		493.00	165.87	0.34

Sediment Delivery Ratio:

D = Da * Dv * Dc * Dp D= 0.25

where: D = sediment delivery ratio	0.25
Da = area delivery ratio	0.50
Dv = Vegetation trapping factor	1.00
Dc = Channelization factor	0.50
Dp = pit deposition factor	1.00

Sediment Yield From Design Watershed:

Y = A * D Y= 41.40 tons/acre

where: Y = Watershed Sediment Yield (Tons / Acre)

A = Soil loss per area (Tons / Acre)

D = Sediment Delivery Ratio

Life of Basin 5.0 years

Sediment Yield Conversion Ac ft / ac year:

Y2 (ac ft/ ac yr) =(Y t/ac * 2000 lb/t) / (90 lb/cubic ft * 43560 sq ft / ac)

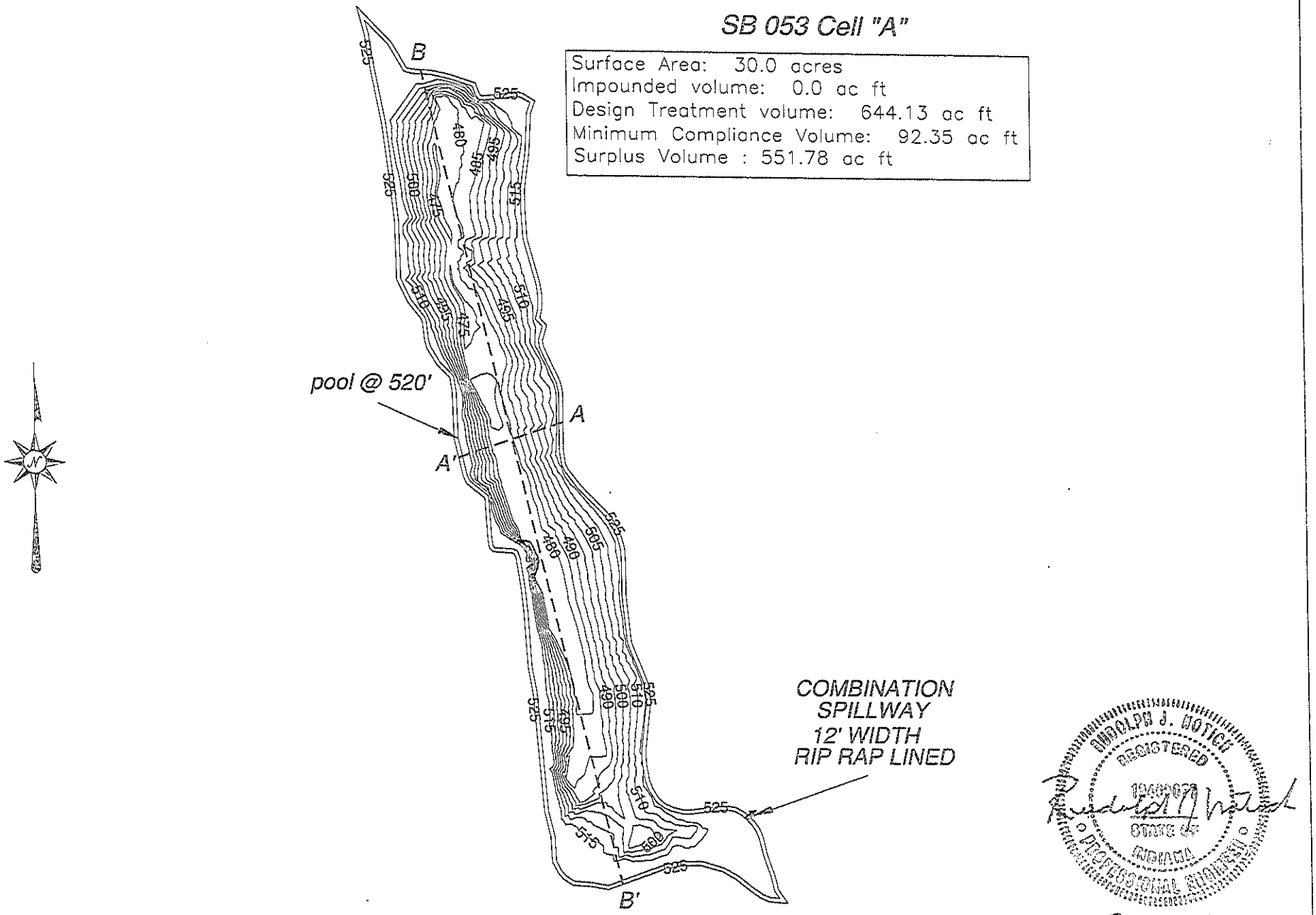
Y2= 0.02112 ac ft / ac yr

Sediment Storage Calculation:

SL = RA * Y2 * YR * 43560 **Design Sediment Storage =** 2267880 cubic ft

SB 053 Cell "A"

Surface Area:	30.0 acres
Impounded volume:	0.0 ac ft
Design Treatment volume:	644.13 ac ft
Minimum Compliance Volume:	92.35 ac ft
Surplus Volume :	551.78 ac ft



HOR. 1" = 500'

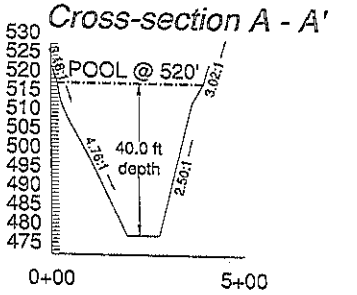
RANDOLPH J. HOTICH
REGISTERED
19400073
STATE OF
INDIANA
PROFESSIONAL ENGINEER

3-16-11

Peabody Midwest Mining LLC	DATE: 3-3-2011	REVISION NO.:	DATE:
Sediment Control Basin SB 053 Cell "A" Plan View Bear Run Mine, Permit #256	SCALE: 1 in = 500 ft	NOTES:	
	SHEET 1 OF 2		

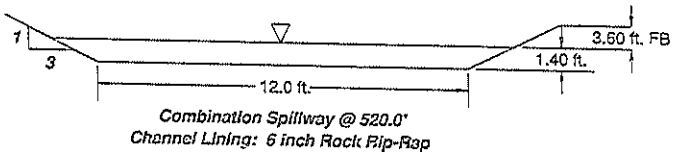
SB 053 Cell "A"

Cross-section A - A'

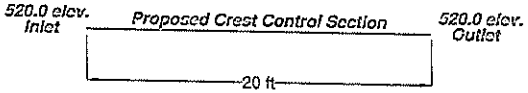


HZ 1 = 500 VT 1 = 50

Basin SB 053 Cell "A" Combination Spillway



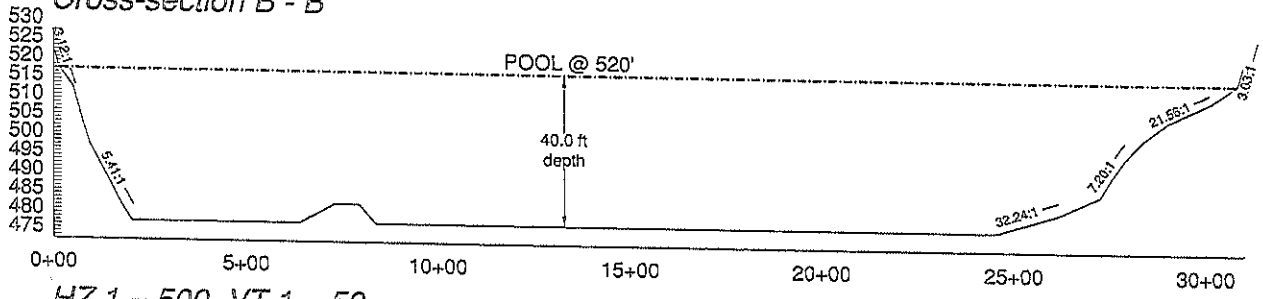
Combination Spillway @ 520.0'
Channel Lining: 6 inch Rock Rip-Rap



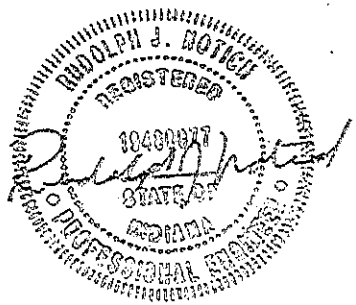
Spillway Profile

NOT TO SCALE

Cross-section B - B'



HZ 1 = 500 VT 1 = 50



3-16-11

Peabody Midwest Mining LLC	DATE: 3-3-2011	REVISION NO.: DATE:
Sediment Control Basin SB 053 Cell "A" Cross-sections and Spillway Section Bear Run Mine, Permit #256	SCALE: As-noted	NOTES:
	SHEET 2 OF 2	

Sediment Basin 053

Cell "B"

Bear Run Mine

Permit S-256

25 Yr. 6 Hr. Storm Calculations

Ken Paul

Peabody Midwest

Phone: 812-434-8586
Email: Kpaul@peabodyenergy.com

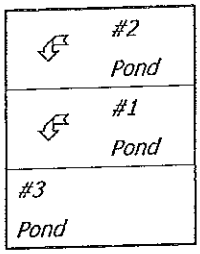
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 6 hr
Rainfall Depth:	3.800 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	#3	0.000	0.000	POND
Pond	#2	==>	#3	0.000	0.000	POND
Pond	#3	==>	End	0.000	0.000	SB 053 Cell "B"



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#2	In	349.290	349.290	584.83	40.18
	Out			58.97	40.19
#1	In	493.000	493.000	659.02	59.01
	Out			76.32	58.09
#3	In	78.000	920.290	158.30	107.24
	Out			138.29	107.04

A

Structure Detail:

Structure #2 (Pond)

POND

Pond Inputs:

Initial Pool Elev:	516.00 ft
Initial Pool:	1773.85 ac-ft

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
516.00	20.00	3.00:1	3.00:1	20.00

Pond Results:

Peak Elevation:	516.67 ft
Dewater Time:	2.12 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
440.00	12.490	0.000	0.000	
442.00	12.972	25.461	0.000	
444.00	13.463	51.895	0.000	
446.00	13.963	79.320	0.000	
448.00	14.473	107.755	0.000	
450.00	14.991	137.218	0.000	
452.00	15.519	167.726	0.000	
454.00	16.055	199.299	0.000	
456.00	16.601	231.954	0.000	
458.00	17.156	265.710	0.000	
460.00	17.720	300.585	0.000	
462.00	18.232	336.536	0.000	
464.00	18.750	373.516	0.000	
466.00	19.276	411.541	0.000	
468.00	19.809	450.624	0.000	
470.00	20.349	490.781	0.000	
472.00	20.897	532.026	0.000	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
474.00	21.452	574.374	0.000		
476.00	22.014	617.839	0.000		
478.00	22.584	662.435	0.000		
480.00	23.160	708.178	0.000		
482.00	23.718	755.054	0.000		
484.00	24.281	803.052	0.000		
486.00	24.852	852.184	0.000		
488.00	25.429	902.463	0.000		
490.00	26.012	953.903	0.000		
492.00	26.603	1,006.517	0.000		
494.00	27.200	1,060.318	0.000		
496.00	27.803	1,115.320	0.000		
498.00	28.414	1,171.536	0.000		
500.00	29.030	1,228.978	0.000		
502.00	30.233	1,288.237	0.000		
504.00	31.461	1,349.927	0.000		
506.00	32.713	1,414.097	0.000		
508.00	33.990	1,480.796	0.000		
510.00	35.291	1,550.072	0.000		
512.00	36.616	1,621.974	0.000		
514.00	37.966	1,696.552	0.000		
516.00	39.340	1,773.853	0.000		Spillway #1
516.67	40.414	1800.877	58.972	45.30	Peak Stage
518.00	41.637	1,854.820	176.689		
520.00	44.000	1,940.446	638.741		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
440.00	0.000	0.000
442.00	0.000	0.000
444.00	0.000	0.000
446.00	0.000	0.000
448.00	0.000	0.000
450.00	0.000	0.000
452.00	0.000	0.000
454.00	0.000	0.000

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
456.00	0.000	0.000
458.00	0.000	0.000
460.00	0.000	0.000
462.00	0.000	0.000
464.00	0.000	0.000
466.00	0.000	0.000
468.00	0.000	0.000
470.00	0.000	0.000
472.00	0.000	0.000
474.00	0.000	0.000
476.00	0.000	0.000
478.00	0.000	0.000
480.00	0.000	0.000
482.00	0.000	0.000
484.00	0.000	0.000
486.00	0.000	0.000
488.00	0.000	0.000
490.00	0.000	0.000
492.00	0.000	0.000
494.00	0.000	0.000
496.00	0.000	0.000
498.00	0.000	0.000
500.00	0.000	0.000
502.00	0.000	0.000
504.00	0.000	0.000
506.00	0.000	0.000
508.00	0.000	0.000
510.00	0.000	0.000
512.00	0.000	0.000
514.00	0.000	0.000
516.00	0.000	0.000
518.00	176.689	176.689
520.00	638.741	638.741

Structure #1 (Pond)

POND

Pond Inputs:

Initial Pool Elev:	520.00 ft
Initial Pool:	658.24 ac-ft

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
520.00	20.00	3.00:1	3.00:1	12.00

Pond Results:

Peak Elevation:	521.40 ft
Dewater Time:	0.66 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
475.00	0.540	0.000	0.000		
477.00	1.737	2.164	0.000		
479.00	3.610	7.398	0.000		
480.00	4.800	11.589	0.000		
481.00	5.359	16.666	0.000		
483.00	6.568	28.572	0.000		
485.00	7.900	43.020	0.000		
487.00	8.755	59.668	0.000		
489.00	9.651	78.067	0.000		
491.00	10.592	98.304	0.000		
493.00	11.577	120.466	0.000		
495.00	12.603	144.639	0.000		
497.00	13.677	170.912	0.000		
499.00	14.792	199.374	0.000		
501.00	15.951	230.110	0.000		
503.00	17.155	263.210	0.000		
505.00	18.400	298.758	0.000		
507.00	19.784	336.934	0.000		
509.00	21.219	377.928	0.000		
511.00	22.703	421.841	0.000		
513.00	24.237	468.772	0.000		
515.00	25.821	518.822	0.000		
517.00	27.455	572.090	0.000		
519.00	29.139	628.676	0.000		
520.00	30.000	658.245	0.000		Spillway #1
521.00	30.579	688.534	31.357	11.69*	
521.40	30.816	700.870	76.325	4.05	Peak Stage

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
523.00	31.753	750.862	258.549	
525.00	32.950	815.562	721.469	

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
475.00	0.000	0.000
477.00	0.000	0.000
479.00	0.000	0.000
480.00	0.000	0.000
481.00	0.000	0.000
483.00	0.000	0.000
485.00	0.000	0.000
487.00	0.000	0.000
489.00	0.000	0.000
491.00	0.000	0.000
493.00	0.000	0.000
495.00	0.000	0.000
497.00	0.000	0.000
499.00	0.000	0.000
501.00	0.000	0.000
503.00	0.000	0.000
505.00	0.000	0.000
507.00	0.000	0.000
509.00	0.000	0.000
511.00	0.000	0.000
513.00	0.000	0.000
515.00	0.000	0.000
517.00	0.000	0.000
519.00	0.000	0.000
520.00	0.000	0.000
521.00	31.357	31.357
523.00	258.549	258.549
525.00	721.469	721.469

Structure #3 (Pond)

SB 053 Cell "B"

Pond Inputs:

Initial Pool Elev:	509.00 ft
Initial Pool:	30.56 ac-ft

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
509.00	20.00	3.00:1	3.00:1	20.00

Pond Results:

Peak Elevation:	510.70 ft
Dewater Time:	0.33 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
500.00	0.220	0.000	0.000		
501.00	0.618	0.402	0.000		
502.00	1.211	1.300	0.000		
503.00	2.000	2.890	0.000		
504.00	2.709	5.235	0.000		
505.00	3.525	8.343	0.000		
506.00	4.449	12.321	0.000		
507.00	5.480	17.277	0.000		
508.00	6.621	23.319	0.000		
509.00	7.870	30.555	0.000		Spillway #1
510.00	8.203	38.591	49.679	1.96*	
510.70	8.440	44.431	138.290	5.95	Peak Stage
511.00	8.542	46.962	176.689		
512.00	8.888	55.676	373.219		
513.00	9.241	64.740	638.741		
514.00	9.600	74.160	976.527		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
500.00	0.000	0.000
501.00	0.000	0.000
502.00	0.000	0.000
503.00	0.000	0.000
504.00	0.000	0.000
505.00	0.000	0.000
506.00	0.000	0.000
507.00	0.000	0.000
508.00	0.000	0.000
509.00	0.000	0.000
510.00	49.679	49.679
511.00	176.689	176.689
512.00	373.219	373.219
513.00	638.741	638.741
514.00	976.527	976.527

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#2	1	349.290	0.202	0.000	0.000	78.000	M	584.83	40.183
	Σ	**349.290**						**584.83**	**40.183**
#1	1	493.000	0.445	0.000	0.000	79.000	M	659.02	59.013
	Σ	**493.000**						**659.02**	**59.013**
#3	1	78.000	0.438	0.000	0.000	78.000	M	100.42	8.964
	Σ	**920.290**						**158.30**	**107.238**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	4. Cultivated, straight row	4.00	20.00	500.00	1.780	0.078
		8. Large gullies, diversions, and low flowing streams	1.85	100.00	5,405.00	4.080	0.367
#1	**1**	**Time of Concentration:**					**0.445**
#2	1	4. Cultivated, straight row	3.00	15.00	500.00	1.540	0.090
		8. Large gullies, diversions, and low flowing streams	2.71	53.90	1,989.00	4.930	0.112
#2	**1**	**Time of Concentration:**					**0.202**
#3	1	3. Short grass pasture	10.00	50.00	500.00	2.520	0.055
		8. Large gullies, diversions, and low flowing streams	0.28	6.00	2,170.00	1.570	0.383
#3	**1**	**Time of Concentration:**					**0.438**

05-Mar-11

Sediment Basin Design Summary

I. General Information

Mine:	Bear Run Pit, Permit #256-4
Basin:	SB 053 cell "B"
Basin Type:	Incised
Examination Exempt:	Yes

II. Design Parameters:

Design Storm Event : (10yr/24hr)	4.45
Runoff Area (RA) (Treatment and Detention)	78.00
Runoff Coefficient (RC)	0.52

III. Runoff Calculation:

RV = RE (in / 24hr) * 1ft/12 in * Runoff Area (ac) * 43,560 sq ft /ac * RC

where: RV = runoff volume (cubic ft/24hr)
RE = runoff design event (inches/24hr)
RC = runoff coefficient

RV = 651222 cubic ft /24hr 14.95 acre ft

IV. Treatment Volume Calculation:

Detention Time: DT	10 hours
Sediment Volume: SV	531438 cubic ft
Pit Pumpage Volume: PV	500 gpm

MCV = RV cf / 24hr * 1day/24hr * DT hr + PV gpm
* 1440 min/day * 1day/24hr *0.1337 cf/gal * DT hr + SV cf

Minimum Compliance volume= 842848 cubic ft 19.35 acre ft

Basin Freeboard:	2.0 ft minimum at pool	
Basin Surface area:	7.87 acres	342817 sq ft
Basin Minimum Average depth	2.46 ft	

Sediment Basin Design:
Universal Soil Loss Calculation:

05-Mar-11

Mine: Bear Run Pit, Permit #256-4 **Basin:** SB 053 cell "B"

Soil Loss per Unit Area:

A= R * K * LS*CP A = 245.28 tons/acre

where: A = Soil loss per acre (tons/acre)

R = Rainfall-Erosivity Factor	200
K = Soil Erodibility Factor	0.43
LS = Length Slope Factor	4.00
CP = Cropping Practice Factor	0.71

LS Factor Calculation

LS = (FSL/72.6)^m * ((430x^2 + 30x + 0.43) / 6.613)) 4.00

where: FSL = Field Slope Length 2670.00

x = Field Slope Ratio 0.0669

m = slope factor 0.5

slope < 3% m=0.3 , = 4% m=0.4, >5% m=0.5

CP Weighted Factor Calculation

Ground Cover Description	CP Value	Area (ac)	CP*ac	
Active Disturbed area	0.90	60.00	54.00	
Reclaimed or Undisturbed	0.09	18.00	1.62	Weighted CP
		78.00	55.62	0.71

Sediment Delivery Ratio:

D = Da * Dv * Dc * Dp D= 0.25

where: D = sediment delivery ratio 0.25

Da = area delivery ratio 0.50

Dv = Vegetation trapping factor 1.00

Dc = Channelization factor 0.50

Dp = pit deposition factor 1.00

Sediment Yield From Design Watershed:

Y = A * D Y= 61.32 tons/acre

where: Y = Watershed Sediment Yield (Tons / Acre)

A = Soil loss per area (Tons / Acre)

D = Sediment Delivery Ratio

Life of Basin 5.0 years

Sediment Yield Conversion Ac ft / ac year:

Y2 (ac ft/ ac yr) =(Y t/ac * 2000 lb/t) / (90 lb/cubic ft * 43560 sq ft / ac)

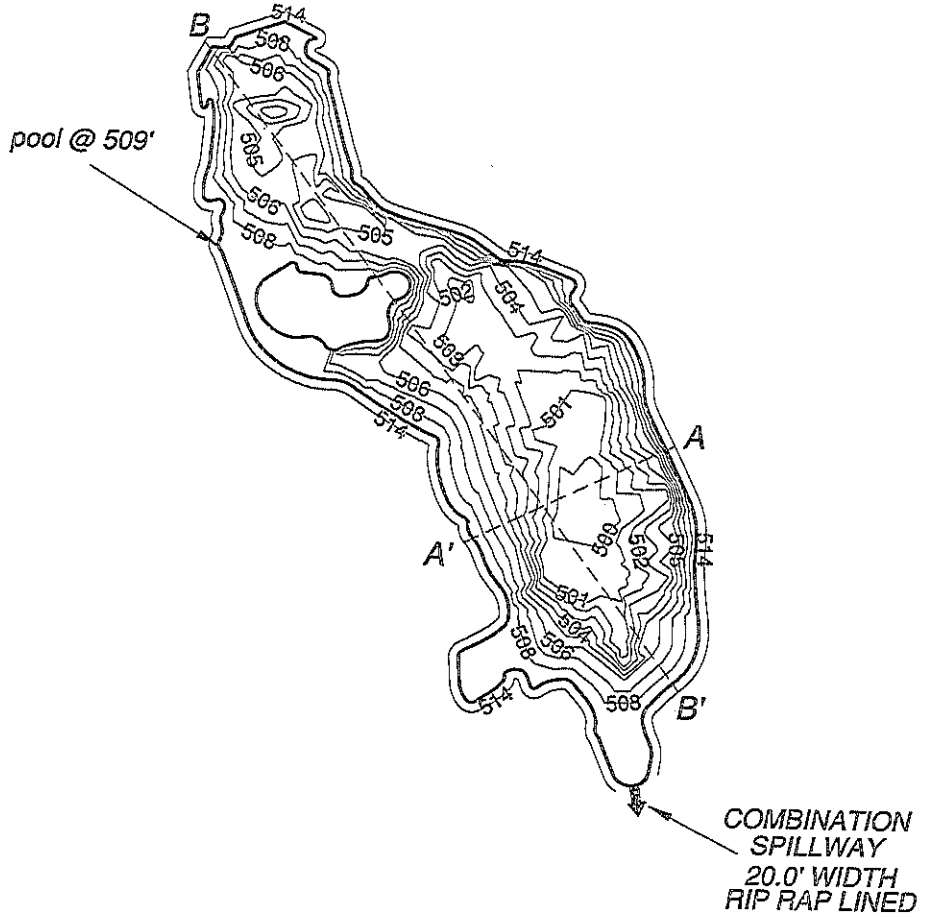
Y2= 0.03128 ac ft / ac yr

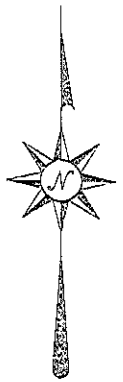
Sediment Storage Calculation:

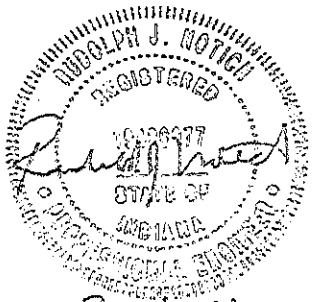
SL = RA * Y2 * YR * 43560 **Design Sediment Storage =** 531438 cubic ft

SB 053 Cell "B" Design Volume Summary

Surface Area	7.87 acres
Impounded volume:	0.0 ac ft
Design Treatment volume:	30.33 ac ft
Minimum Compliance Volume:	19.35 ac ft
Surplus Volume:	10.98 ac ft





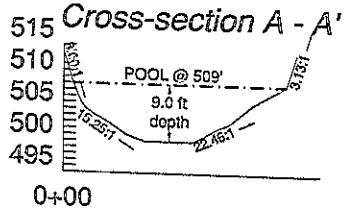


3-16-11

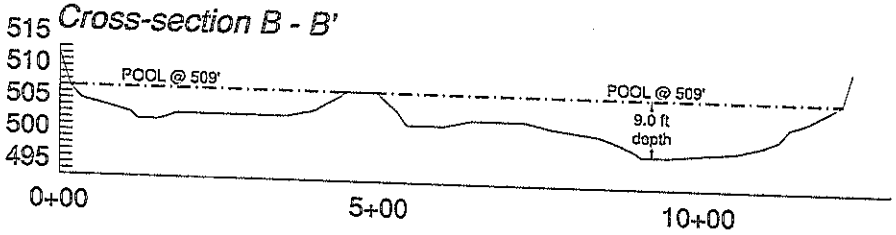
HOR. 1" = 300'

Peabody Midwest Mining LLC	DATE: 3-3-2011	REVISION NO.:	DATE:
Sediment Control Basin SB 053 Cell "B" Plan View Bear Run Mine, Permit #256	SCALE: 1 in = 300 ft	NOTES:	
	SHEET 1 OF 2		

Basin SB 053 Cell "B"

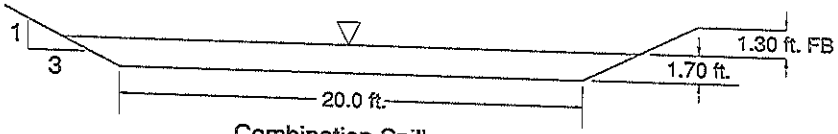


HZ 1 = 300 VT 1 = 30

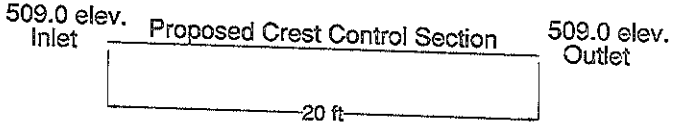


HZ 1 = 300 VT 1 = 30

Basin SB 053 Cell "B" Combination Spillway

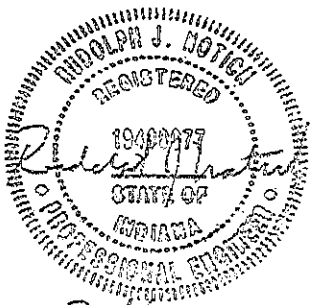


Combination Spillway
Channel Lining: 6 inch Rock Rip-Rap



Spillway Profile

NOT TO SCALE



3-16-11

Peabody Midwest Mining LLC	DATE: 3-3-2011	REVISION NO.: DATE:
Sediment Control Basin SB 053 Cell "B" Cross-sections and Spillway Section Bear Run Mine, Permit #256-4	SCALE: As-Noted	NOTES:
	SHEET 2 OF 2	